A STUDY OF CLINICAL, BACTERIOLOGICAL AND RADIOLOGICAL PATTERN OF PULMONARY TUBERCULOSIS AMONG HIV SEROPOSITIVE INDIVIDUALS IN GOVT KILPAUK MEDICAL COLLEGE HOSPITAL

A Dissertation Submitted to

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for the Award of the Degree of

M.D. (GENERAL MEDICINE) - BRANCH – I

GOVERNMENT KILPAUK MEDICAL COLLEGE

CHENNAI

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BONAFIDE CERTIFICATE

This is to certify that **"A STUDY OF CLINICAL, BACTERIOLOGICAL AND RADIOLOGICAL PATTERN OF PULMONARY TUBERCULOSIS AMONG HIV SEROPOSITIVE INDIVIDUALS IN GOVT KILPAUK MEDICAL COLLEGE HOSPITAL"** is a bonafide work performed by **Dr.A.R.BALAMURUGAN**, post graduate student, Department of Internal Medicine, Kilpauk Medical College, Chennai-10, under my guidance and supervision in fulfilment of regulations of the Tamil Nadu Dr. M.G.R Medical university for the award of M.D. Degree Branch I (General Medicine) during the academic period from July 2013 to April 2016.

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DECLARATION

I, **Dr. A.R.BALAMURUGAN,** declare that, I carried out this work on, **"A STUDY OF CLINICAL, BACTERIOLOGICAL AND RADIOLOGICAL PATTERN OF PULMONARY TUBERCULOSIS AMONG HIV SEROPOSITIVE INDIVIDUALS IN GOVT KILPAUK MEDICAL COLLEGE HOSPITAL"** in the Department of Medicine, during the period of January 2015 to August 2015. This is submitted to The Tamilnadu Dr.M.G.R.Medical University, Chennai in partial fulfillment of the requirement for the award of M.D degree (Branch –I) General Medicine.

Place: Chennai (**Dr. A.R.BALAMURUGAN)**

Date:

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INTRODUCTION

Tuberculosis is caused by Bacteria, mycobacterium tuberculosis. "Tuberculosis (TB) is the number one infectious disease killer worldwide". TB and HIV combination forms the deadly synergy in India. It leads to 'unwanted outcomes "[10]. "HIV increases the risk of progression of latent TB infection to active TB disease thus increasing risk of death if not timely treated for both HIV and TB" . TB is the most common opportunistic infection and cause of mortality among PLHA patients. "Difficult to diagnose, treat and related to co-morbidity, pill burden, co-toxicity and drug interactions". Pulmonary infections have diverse presentations in the HIV patients, creating difficulty in diagnosis and treatment. "The chest X ray appearances of patients presenting with pulmonary symptoms are frequently nonspecific"[6].

"It is estimated that roughly 65-70% of HIV patients will develop tuberculosis in their lifetime". "50% of adult Indian population is infected with Mycobacterium tuberculosis"[6] .Those patients, early in the course of HIV infection would be expected to present similarly to Non HIV individuals with normal cellular immunity, while those late in the course of HIV may have a different presentation.. "India ranks second in the globe that contribute to 10-15% of HIV-associated TB"

This study is being done to diagnose Tuberculosis in early stage by studying the clinical, radiological and bacteriological features of pulmonary tuberculosis in HIV patients and plan for further treatment, thereby preventing the spread of TB in the community by giving treatment as early as possible.

AIMS AND OBJECTIVES:

- To evaluate the clinical , bacteriological and radiological pattern of pulmonary tuberculosis among HIV seropositive patients in Kilpauk medical college

REVIEW OF LITERATURE

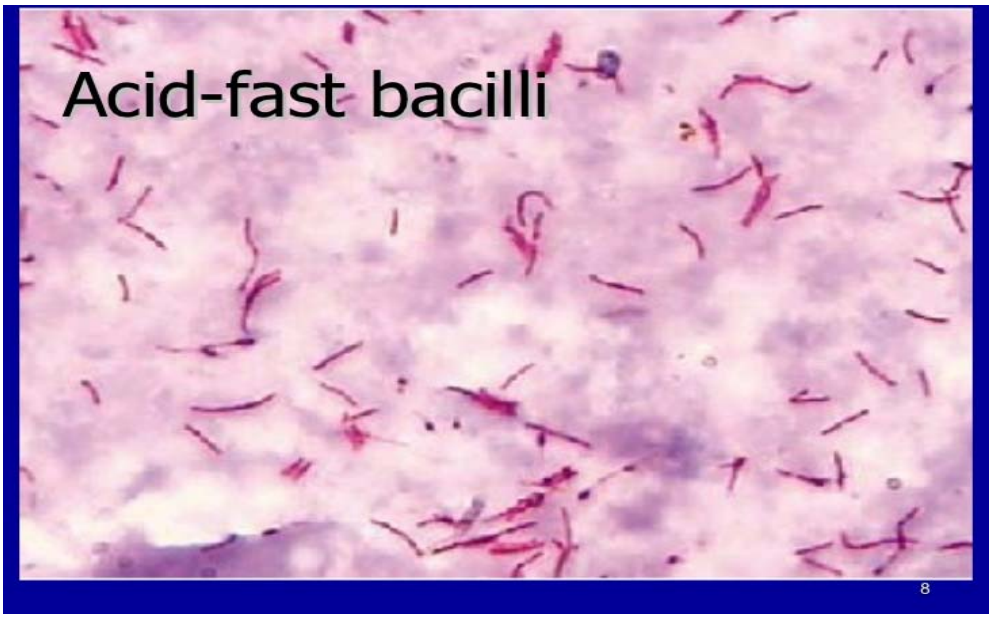
BACKGROUND:

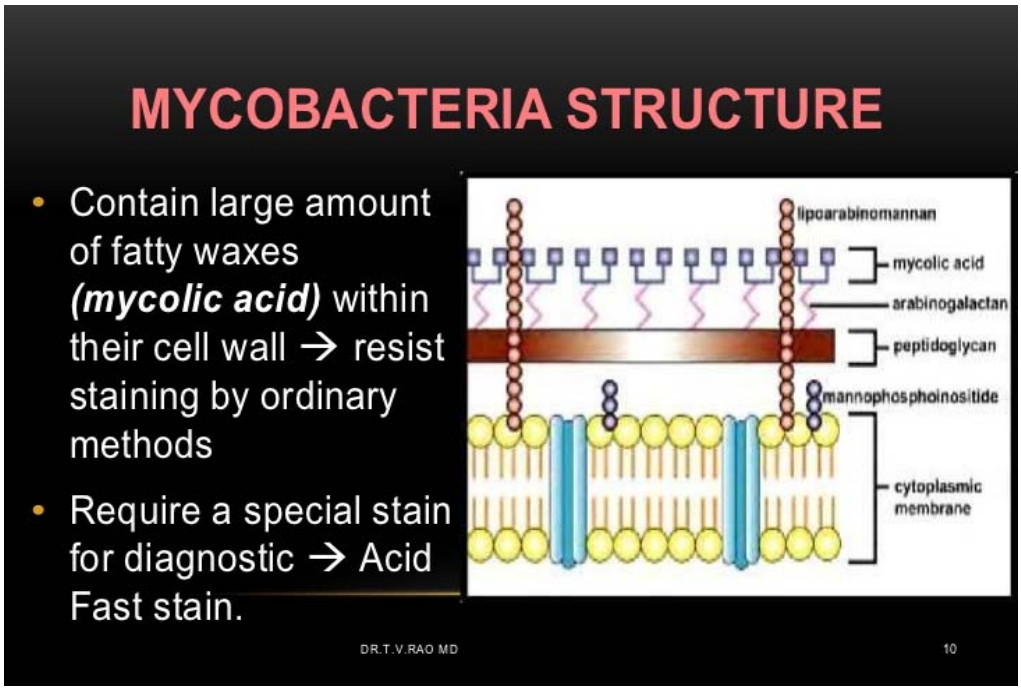
"There is increased incidence of TB in HIV positive patients". **Both TB and HIV are called double trouble** . "TB has a rapidly progressive and often a fatal course in HIV positive patients [4] .Increased re-activation of latent PT occurs". "Mantoux test is false-negative. Smear may be negative and hence culture is vital. There are many atypical features". There is higher frequency of miliary tuberculosis, hilar adenopathy, extrapulmonary involvement. There is lower frequency of focal infiltrates and cavities. "We should diagnose TB as early as possible and we should treat both TB and HIV to prevent mortality"

ETIOLOGY:

It is a slender rod sometime showing branching filaments. "**It is an acid fast bacilli, aerobic nonmotile, noncapsulated, nonsporing organism**". "Transmission is by droplet nuclei of 1-5 μ in diameter which deposits in the alveoli"[4

Fig 1&2: STRUCTURE OF ACID FAST BACILLI & MYCOBACTERIA:





HISTORICAL IMPORTANCE:

Tuberculosis lesions were seen in vertebrae of Neolithic man in Europe and in Egyptian mummies[3]. Skeleton remains to show prehistoric humans (4000 BC) had TB and "tubercular decay has been found in the spines of Egyptian mummies from 3000-2400 BC"

"Other names for tuberculosis are"[9]

- **Consumption** -Tuberculosis seemed to consume people from within with its symptoms of bloody cough, fever, pallor, and long relentless wasting
- **Wasting disease**
- **White plague**
- **Phthisis** and **phthisis pulmonalis**
- **"King's evil"[14]**
- **Koch's Disease** named after Robert Koch who discovered the tuberculosis bacilli ."***The bacilli*** **was identified and described on March 24, 1882 by Robert Koch**. He received the Nobel Prize in 1905 for this discovery"[3]

Fig 3: ROBERT KOCH

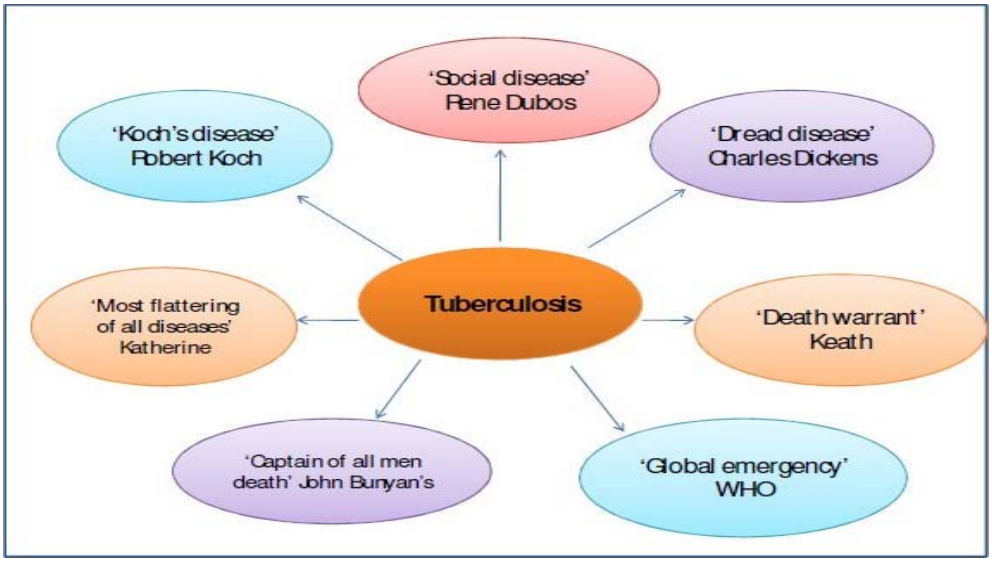


Fig 4: Various names of Tuberculosis

EPIDEMIOLOGY:

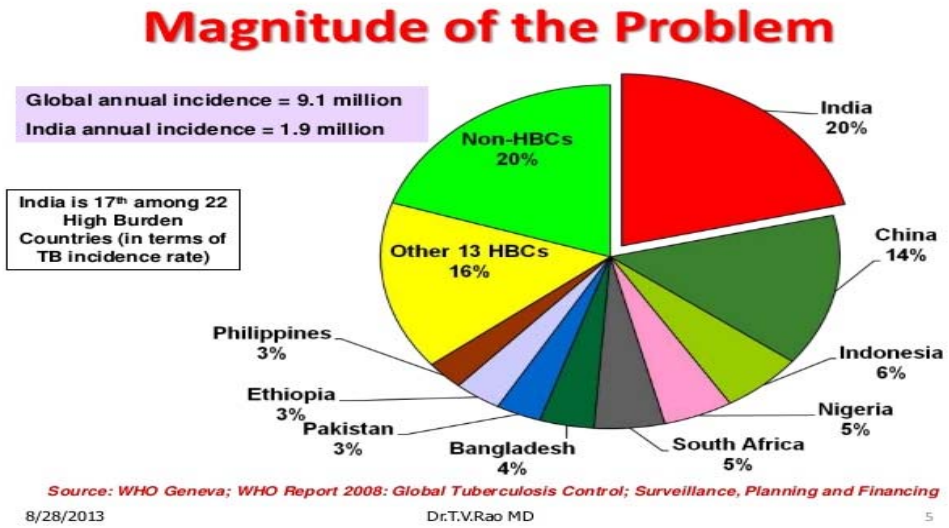


Fig 5: Global incidence of TB

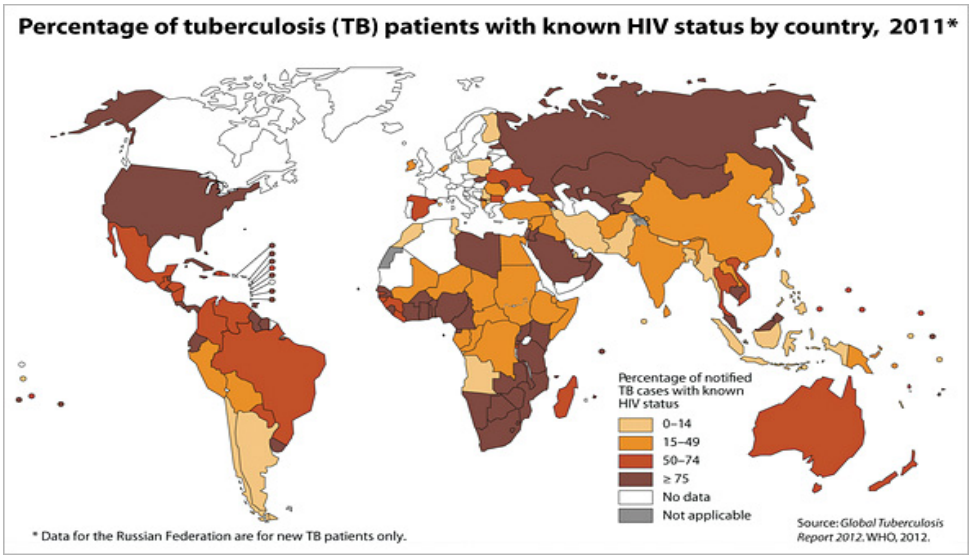


Fig 6: Global incidence of TB in HIV patients

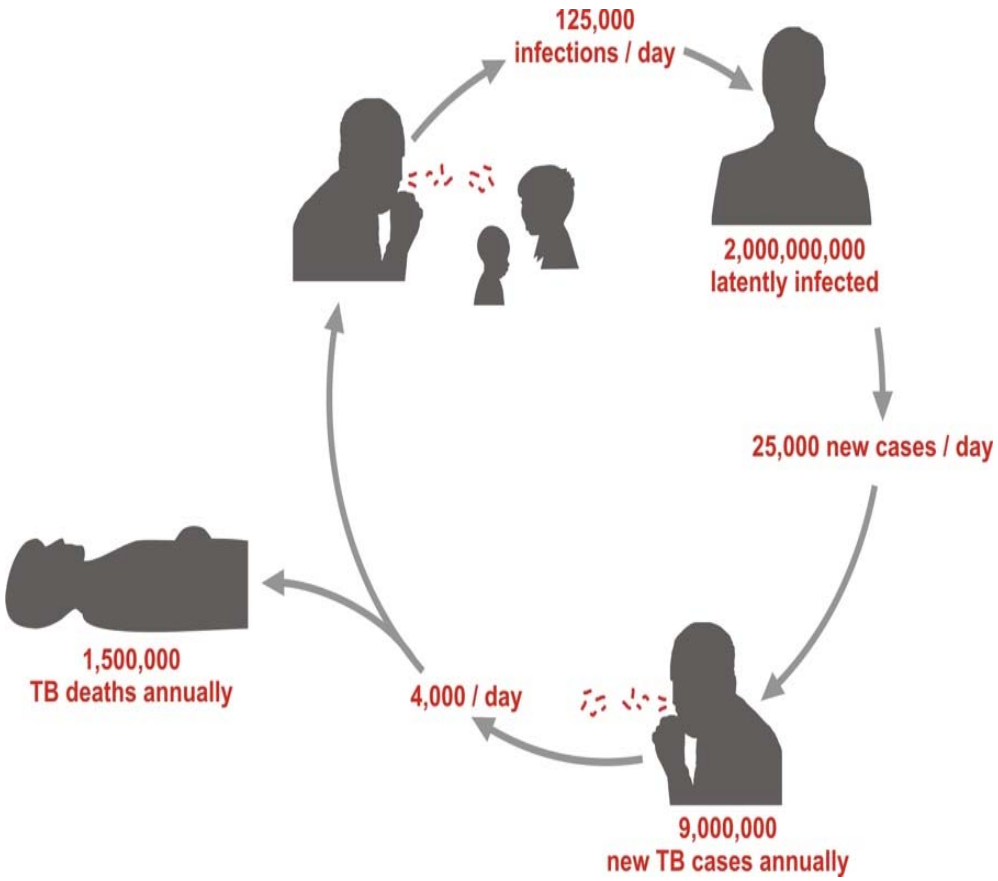


Fig 7: Annual incidence of TB in India

PATHOLOGY AND PATHOGENESIS:

80 to 90% of those infected with *Mycobacterium tuberculosis* have asymptomatic latent TB infection , with "only a 10% lifetime chance that a latent infection will progress to TB disease" [(5)].

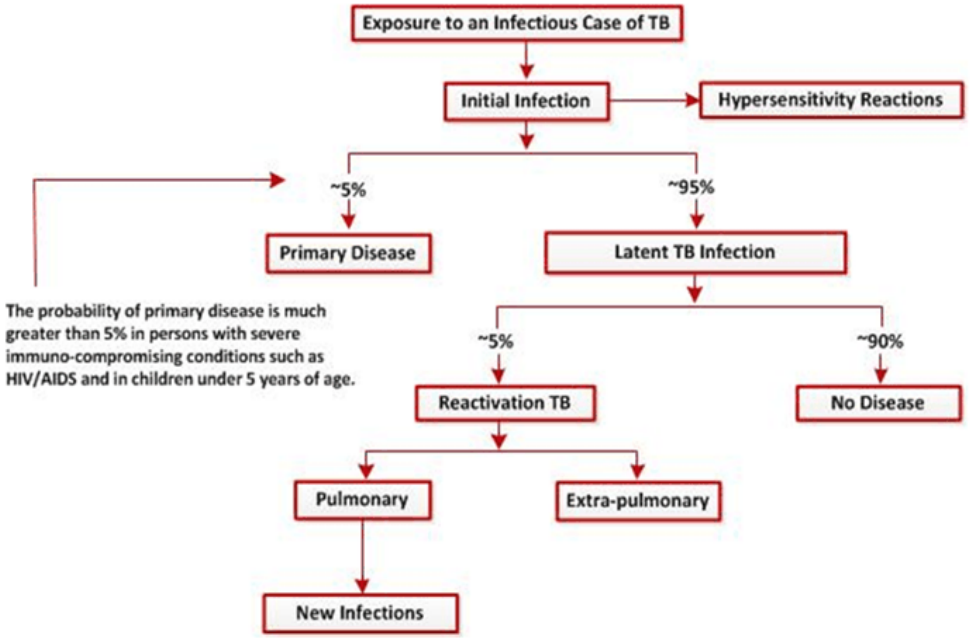


Fig 8a : Pathogenesis of Tuberculosis

"However, if untreated, the death rate for these active TB cases is more than 50 percent". TB infection begins when the mycobacteria reach the pulmonary alveoli ,where they invade and replicate within alveolar macrophages. The primary site of infection in the lungs is called the Ghon focus which is the subpleural focus in lower lobe

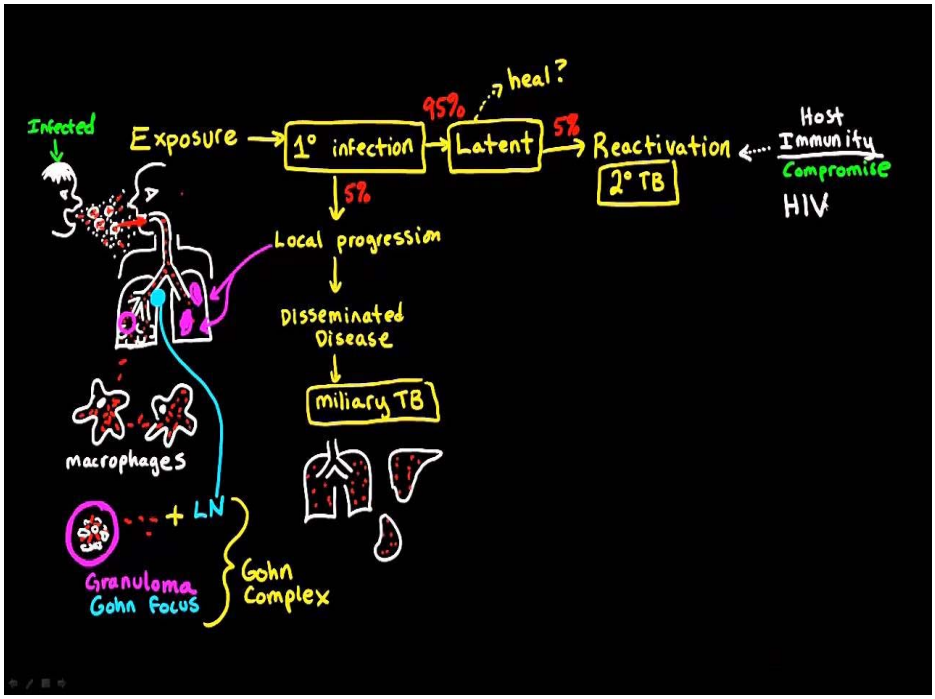


Fig 8b: Pathogenesis of Tuberculosis

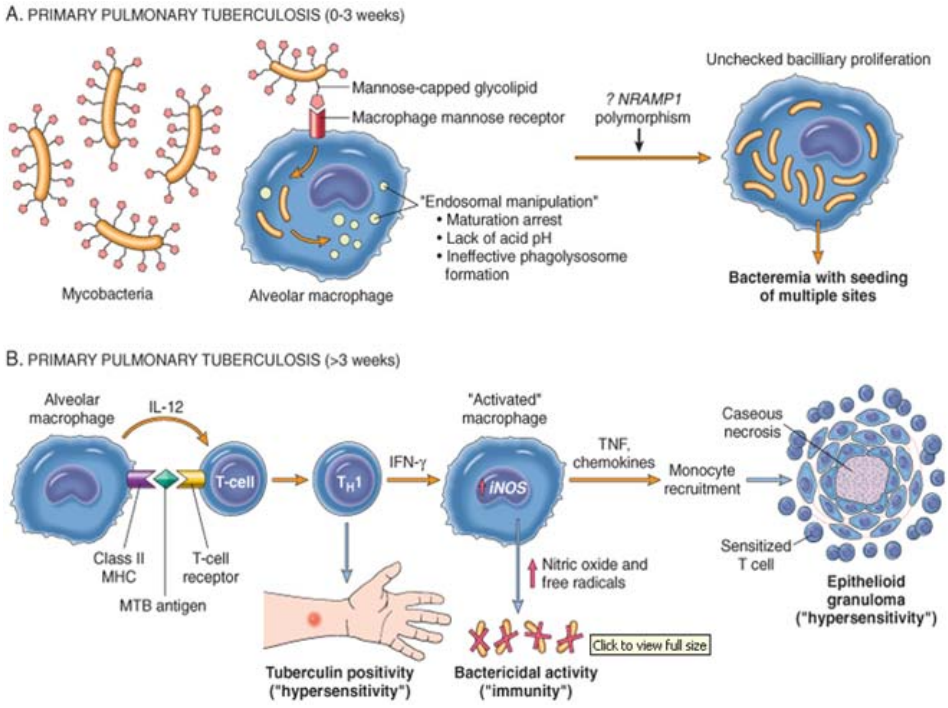


Fig 8c: Pathogenesis of Tuberculosis

"Bacteria picked up by dendritic cells[3] , which do not allow replication, although these cells can transport the bacilli to local lymph nodes" . "Further spread is through the bloodstream to the more distant tissues and organs where secondary TB lesions can develop in lung apices, peripheral lymph nodes, kidneys, brain, and bones". All parts of the body can be affected by the disease, though it rarely affects the heart, skeletal muscles , pancreas, nails, hairs and thyroid.

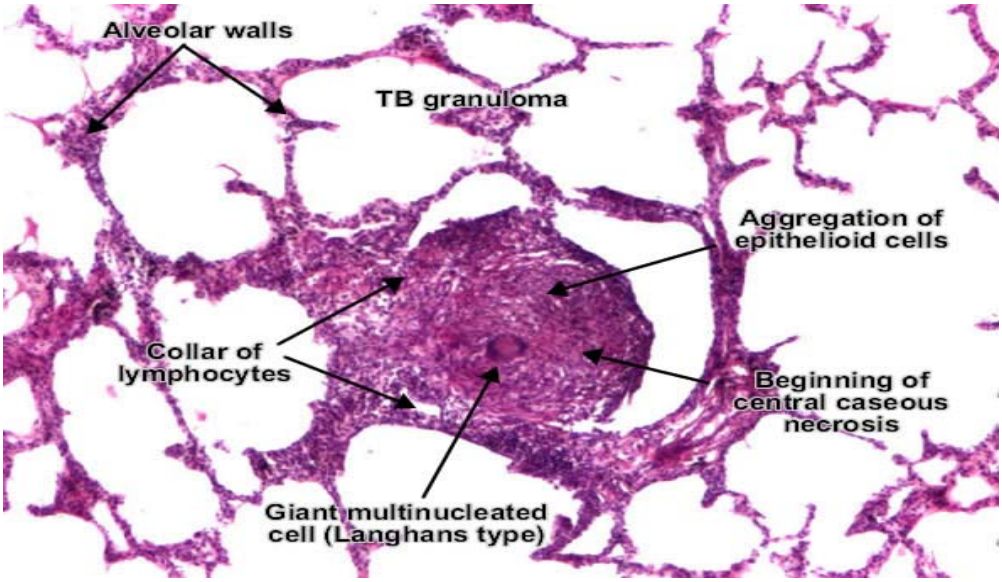


Fig 9: Histology of TB Granuloma

"Macrophages, T lymphocytes, B lymphocytes and fibroblasts are among the cells that aggregate to form a granuloma with lymphocytes surrounding the infected macrophages".

Within the granuloma, "T lymphocytes[8] (CD4+) secrete cytokines such as interferon gamma which activates macrophages to destroy the

bacteria with which they are infected". T lymphocytes (CD8+) can also directly kill infected cells. Another feature of the granulomas of human tuberculosis is the development of cell death, also called the term necrosis, in the center of tubercles[12].

Severe form of TB disease is most common in infants and the elderly and is called miliary TB. "Disseminated tuberculosis defined as occurence in more than 2 noncontiguous organs, a fatality rate [2] of upto 20%, even with effective treatment".

"Tissue destruction and necrosis are balanced by healing and fibrosis".

During active disease, some of these cavities are joined to the air passages bronchi and this material can be coughed up. It contains living bacteria and can therefore pass on infection.

CLINICAL MANIFESTATIONS:

Clinical features of TB are closely related to the level of immune deficiency of the HIV patient. As the CD4 lymphocytes level drops, the appearance of TB changes from the typical localized form to atypical disseminated forms.

PULMONARY TB:

MANIFETATIONS	IMMUNE DEFICIENCY EARLY STAGE (>200 CD/MM3)	IMMUNE DEFICIENCY ADVANCED STAGE (<200CD/MM3)
CLINICAL	PULMONARY TB	SEVERE PULMONARY TB
RADIOLOGICAL	INVOLVEMENT OF THE UPPER LOBES CAVITIES	INTERSTITIAL INVOLVEMENT, MILIARY DISEASE, LYMPHADENOPATHY, PLEURISY, ABSENCE OF CAVITIES
BACTERIOLOGICAL	SMEARS USUALLY POSITIVE	SMEARS USUALLY NEGATIVE, NEGATIVE TST

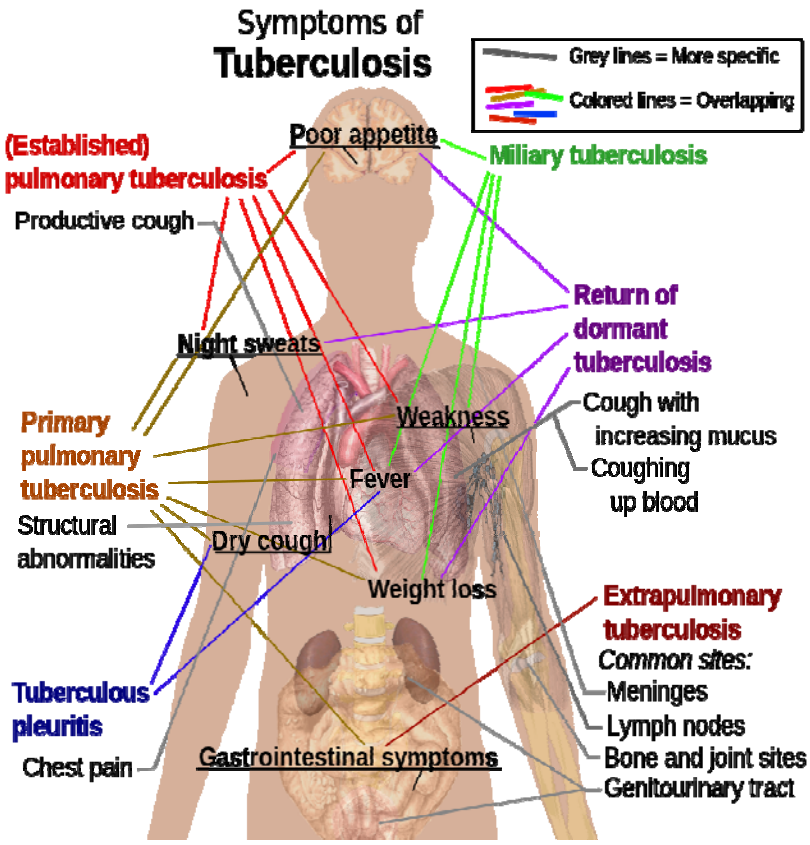


Fig 10: Clinical features of TB in HIV

DIAGNOSIS OF TUBERCULOSIS :

SPUTUM AFB

CHEST XRAY

SPUTUM CULTURE(solids and liquids)

MANTOUX TEST

MOLECULAR METHODS ("GENE XPERT-RIF")

INTERFERON GAMMA RELEASE ASSAY

SEROLOGICAL METHODS

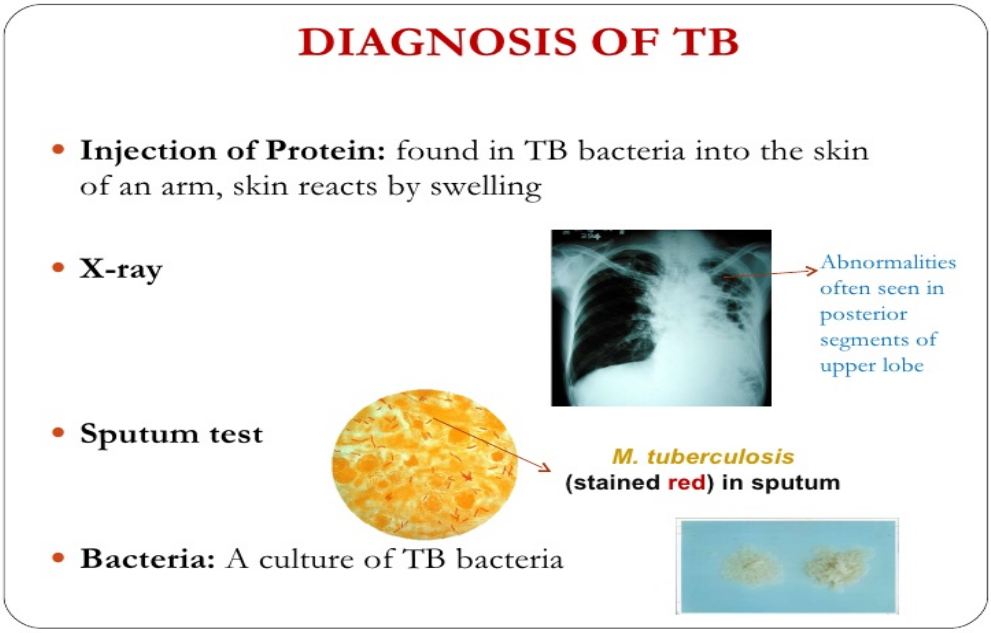


Fig 11: Diagnosis of Tuberculosis

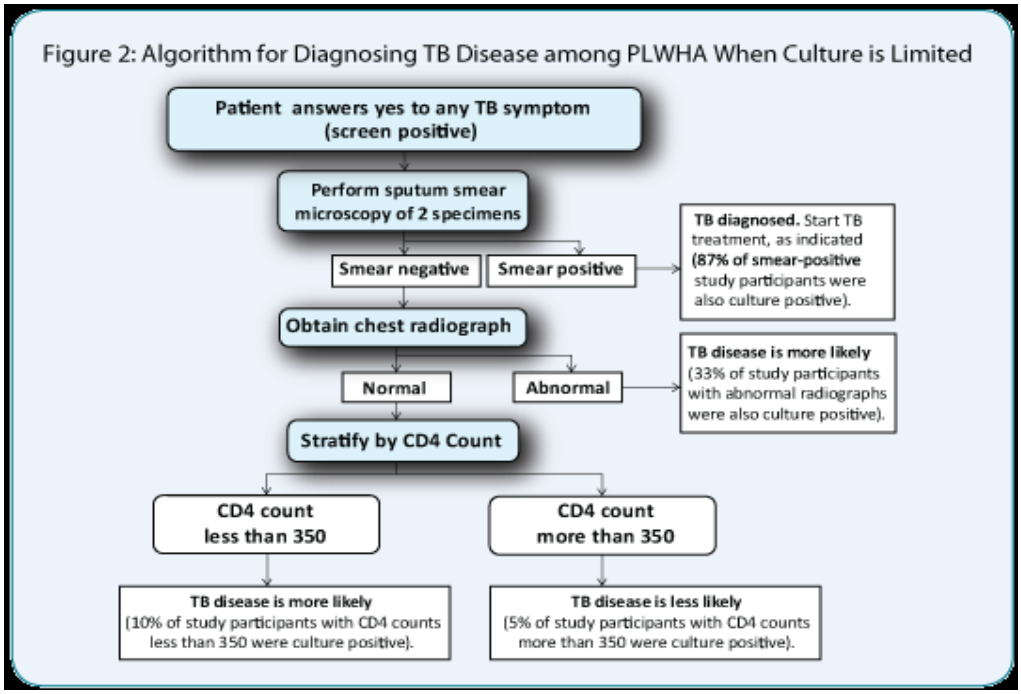


Fig 12: Diagnosis of TB in HIV patients

MICROBIOLOGICAL METHODS[11]

"A definitive diagnosis of tuberculosis can only be made by culturing *Mycobacterium tuberculosis* organisms from a specimen taken from the patient"[2] Sputum smears and cultures should be done for acid-fast bacilli if the patient is producing sputum. "The preferred method for this is fluorescence microscopy (auramine-rhodamine staining), which is more sensitive than conventional Ziehl- Neelsen staining".

MEAN TIME TO DIAGNOSE TB CASES

GENEXpert - 90 minutes

Sputum microscopy - 24 hrs

Liquid culture - 18 days

Solid culture medium - >32 days

CONTENTS OF L-J MEDIUM:

Coagulated hen's egg

Asparagine (source of nitrogen)

Malachite Green

Glycerol(CO2 supply)

MgSo4,Potassium disulphate

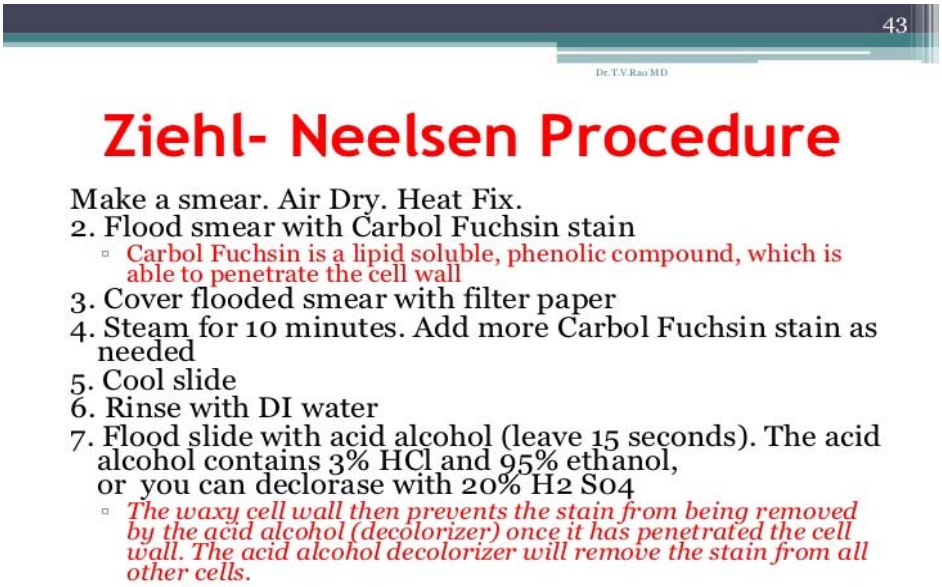


Fig 13: Ziehl Neelson staining method

If no sputum is being produced, specimens can be obtained by inducing sputum, genital warts, a laryngeal swab, bronchoscopy with bronchoalveolar lavage, or fine needle aspiration of a collection [(2)]. Routinely cultures have used the Löwenstein-Jensen (LJ), Kirchner, or Middlebrook media (7H9, 7H10, and 7H11).

"MOLECULAR METHODS TO DIAGNOSE TB"

"We can get the Results within 100 mts, sensitivity increased upto 92 % if 3 samples were tested"[(16)]. More useful for HIV with TB cases and to detect MDR TB cases[(16)]

"IGRA used to diagnose LTBI and is particularly useful in profoundly ill patients and those with severe malnutrition". "There are two in vitro tests to detect latent tuberculosis

QUANTIFERON TB GOLD and T SPOT-TB test

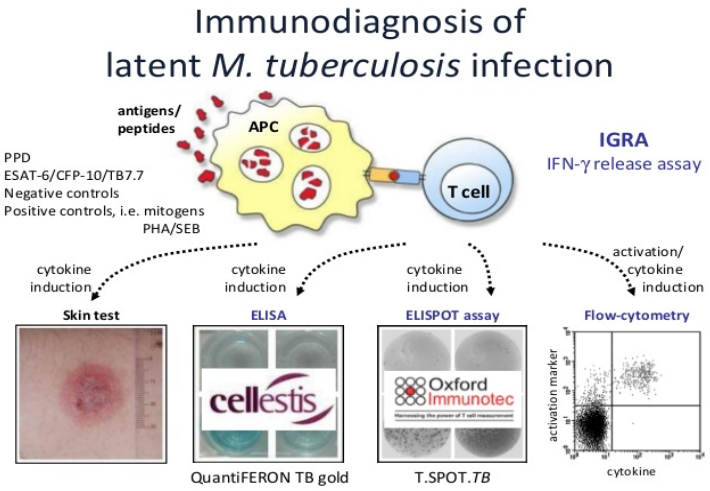


Fig 14: Immunodiagnosis of LTBI

The problem with IGRA is more expensive, skill needed, not suitable for serial testing. The advantage is high specificity and single patient visit enough.

WHO banned use of serology to diagnose TB.

"Mantoux skin test"

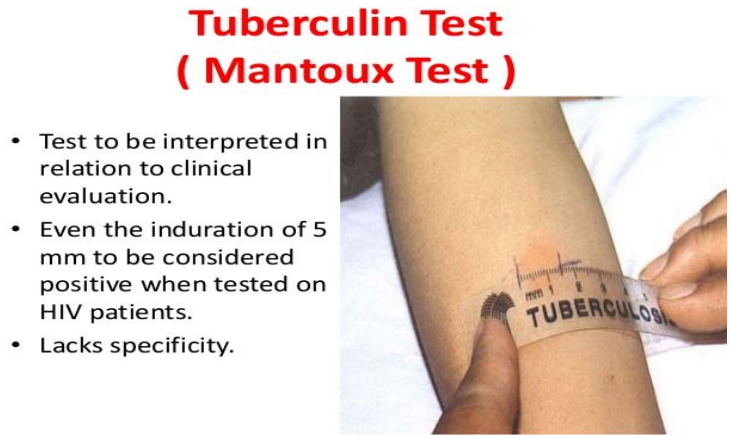


Fig 21: Tuberculin test reading

"Reading mantoux after 48-72 hrs"

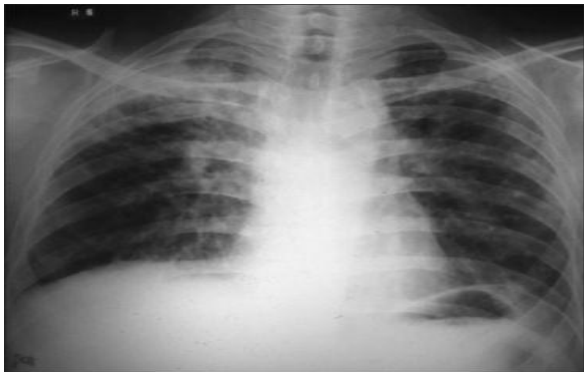


Fig 15: Rt upper lobe infiltration

Fig 16: Bilateral extensive infiltrations due to TB

Fig 17: Miliary TB in HIV patient

Fig 18: Left Pleural Effusion

Fig 19: Left upper lobe cavity with infiltrations in HIV-TB coinfction

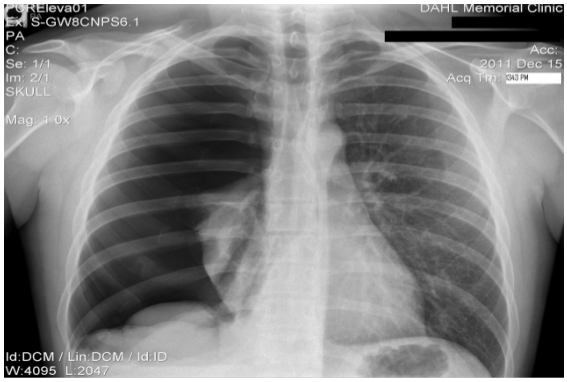


Fig 20: Rt sided pneumothorax HIV-TB coinfction

TUBERCULIN SKIN TEST[13]

TST vs. IGRA

TST	IGRA
Good for serial testing	Not as good for serial testing
Inexpensive	More expensive
Universally accessible	Skill, equipment and timeframe needed limit accessibility
Low specificity in certain populations (BCG-60%)	High specificity in all populations
Two visits	One visit
Variability in test interpretation by reader *****	Low variability in test interpretation by reader

Fig 22: TST vs IGRA

Gene Xpert-Rif:

- Recently, the WHO endorsed the use of Gene Xpert-Rif for the rapid diagnosis of TB as well as rifampicin resistance among HIV-infected individuals with clinical suspicion of TB.
- Gene Xpert is a TB-specific automated, cartridge-based nucleic acid amplification assay, having fully integrated automated sample preparation, amplification and detection using real-time PCR, providing results within 100 minutes.
- Sensitivity of a single Xpert MTB/RIF test in smear-negative/culture positive patients was 72.5 per cent which increased to 90.2 per cent when three samples were tested. Xpert MTB/RIF specificity was 99 per cent.
- HIV co-infection substantially decreased the sensitivity of microscopy (to 47%), but did not significantly affect Xpert MTB/RIF performance.
- Xpert MTB/RIF detected rifampicin resistance with 99.1% sensitivity and excluded resistance with 100 per cent specificity

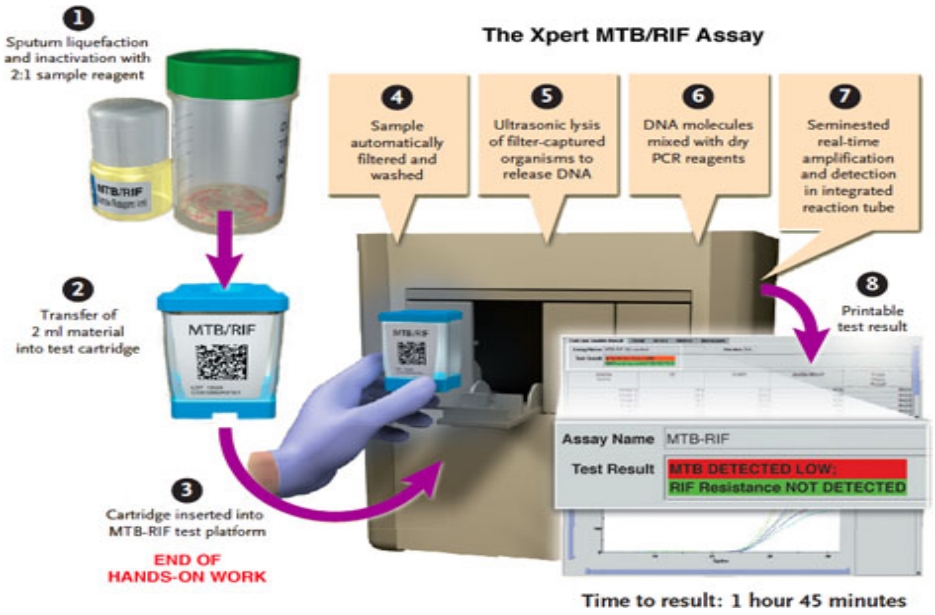


Fig 23: Genexpert analyser

"Clinical features of TB in HIV-infected persons Pulmonary TB" :

" In patients with mild immuno suppression, the clinical picture often resembles usual adult post-primary pulmonary TB" the sputum smear is mostly positive and the [(1)]chest X-ray typically shows unilateral or bilateral upper lobe infiltrates, cavity, pulmonary fibrotic strands, or volume loss. In persons with advanced HIV infection, disseminated and extrapulmonary TB are more common than in early HIV infection, and may be as common as pulmonary TB. "The most common forms of EPTB seen are lymphadenitis, pleural effusion, pericarditis, miliary disease and meningitis. "Of the two sputum specimens, one is collected

on the spot and the other is preferably an early morning sample collected at home by the patient".

Tuberculosis is classified into pulmonary or extrapulmonary, smear-positive or smear-negative disease **. "**A patient with one or two smears being positive for AFB out of the two sputum specimens subjected for smear examination by direct microscopy is smear positive pulmonary TB" **(1)**.

"Patients with two smear negative on first occasion, persisting with symptoms following 10 - 14 days of broad spectrum antibiotics (other than those having anti tubercular activity) and repeat sputum examination being negative with radiological abnormalities suggestive of active TB is diagnosed as having smear negative pulmonary tuberculosis". "Extra-pulmonary TB Tuberculosis of organs other than the lungs such as pleura, lymph nodes, intestine, genitor-urinary tract, joint and bones, meninges of the brain etc., is called as extra- pulmonary TB

“ **Pleural tuberculosis is classified as extra pulmonary”.**

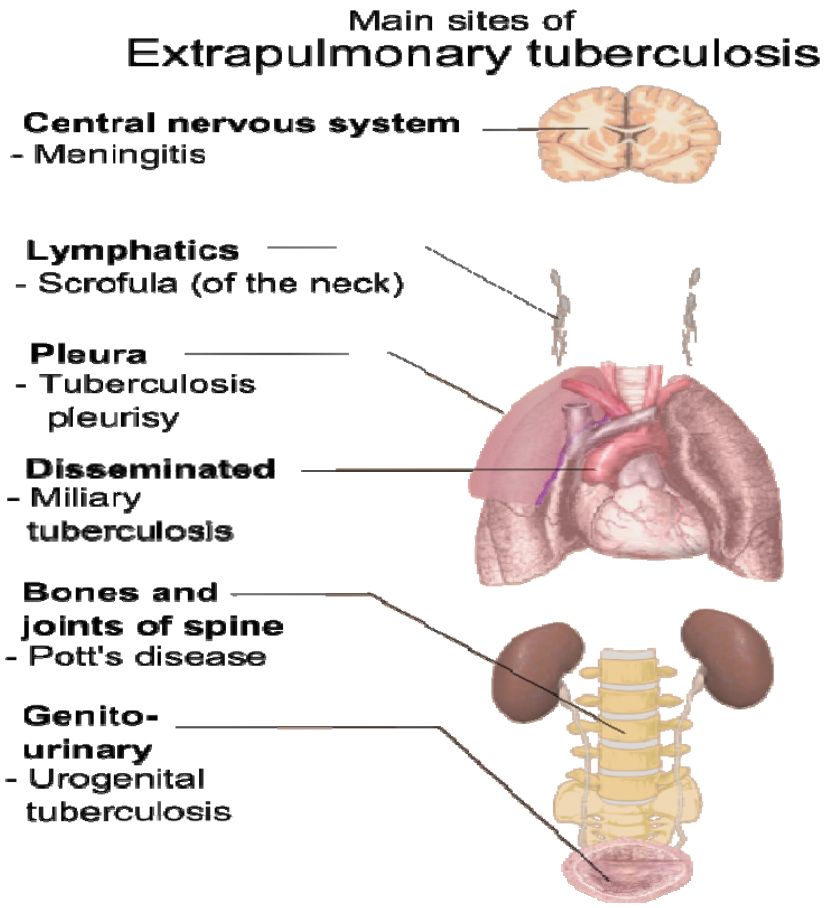


Fig 24: Extrapulmonary TB symptoms

COMPLICATION OF TUBERCULOSIS:

TB PLEURISY

PNEMOTHORAX

DISSEMINATED TB

EMPYEMA, PYOPNEMOTHORAX

ASPERGILLOMA

HEMOPTYSIS

PONCET DISEASE

SCAR CARCINOMA

RESPIRATORY FAILURE

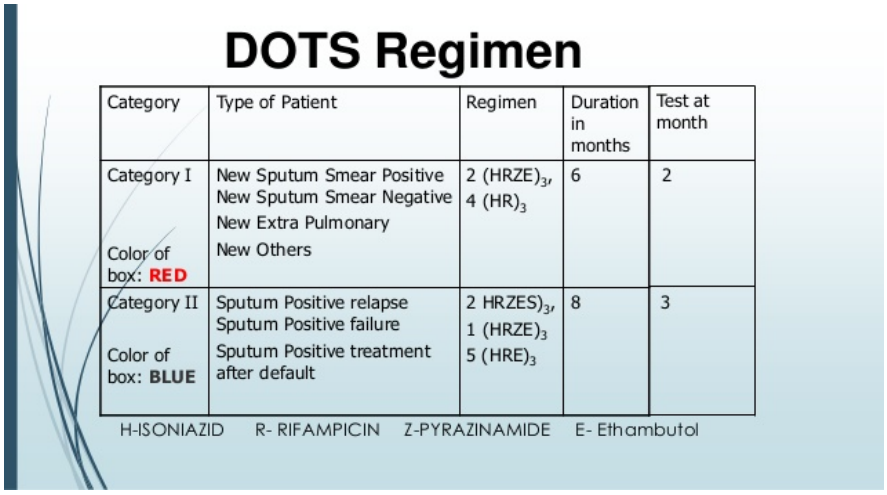
RIGHT VENTRICULAR FAILURE

TB SPINE, TB ENTERITIS, TB LARYNGITIS.

Treatment of TB in HIV-infected persons

"Treatment of TB in HIV is same as treatment of Tuberculosis in persons without HIV infection". First, all HIV-infected patients should be treated with a Category I or Category II[(1)] . “Directly Observed Treatment of quality-assured anti-TB drugs is the foundation of the internationally recommended DOTS strategy, which maximizes cure by providing effective medicines and confirming that they are taken". "DOTS is not just supervised swallowing; it is a mechanism to support the patient to complete the treatment. It is very important to ask history of previous anti - tuberculosis treatment to help define a case and to prescribe appropriate category of ATT. "There are significant drug interactions with the PIs and rifampicin". Protease inhibitors should not be used with rifampicin regimens due to hepatic enzyme inducing capacity of rifampicin, which may leads to Protease levels sub therapeutic. " Rifabutin is a less potent inducer of CYP 3A4 liver enzyme

as compared to rifampicin, while being equally safe and effective for treatment of TB.

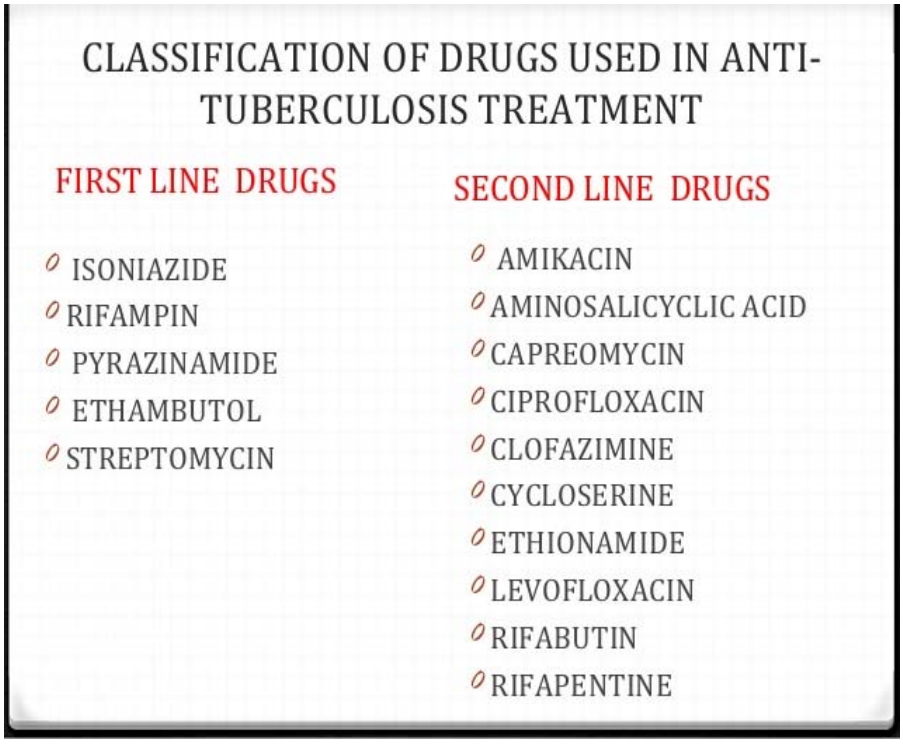


DOTS Regimen

Category	Type of Patient	Regimen	Duration in months	Test at month
Category I Color of box: **RED**	New Sputum Smear Positive New Sputum Smear Negative New Extra Pulmonary New Others	2 $(HRZE)_3$, 4 $(HR)_3$	6	2
Category II Color of box: **BLUE**	Sputum Positive relapse Sputum Positive failure Sputum Positive treatment after default	2 $HRZES)_3$, 1 $(HRZE)_3$ 5 $(HRE)_3$	8	3

H-ISONIAZID R- RIFAMPICIN Z-PYRAZINAMIDE E- Ethambutol

Fig 25: DOTS Therapy



CLASSIFICATION OF DRUGS USED IN ANTI-TUBERCULOSIS TREATMENT

FIRST LINE DRUGS

- ISONIAZIDE
- RIFAMPIN
- PYRAZINAMIDE
- ETHAMBUTOL
- STREPTOMYCIN

SECOND LINE DRUGS

- AMIKACIN
- AMINOSALICYCLIC ACID
- CAPREOMYCIN
- CIPROFLOXACIN
- CLOFAZIMINE
- CYCLOSERINE
- ETHIONAMIDE
- LEVOFLOXACIN
- RIFABUTIN
- RIFAPENTINE

Fig 26a: Classification of ATT drugs

Table 3a: WHO recommended doses of the first-line anti-tuberculosis drugs

Drugs	Daily doses (mg/kg)	Route	Thrice weekly dosage (mg/kg/dose)
Isoniazid (H)	5 (4–6)	Oral	10 (8–12)
Rifampin (R)	10 (8–12)	Oral	10 (8–12)
Ethambutol (E)	15 (15–20)	Oral	30 (25–35)
Pyrazinamide (Z)	25 (25–30)	Oral	35 (30–40)
Streptomycin (S)	15 (12–18)	Oral	15 (12–18)

Table 3b: Recommended doses of second-line anti-TB drugs

Drugs	Daily doses (mg/kg)	Route	Maximum daily dose
Kanamycin (K)	15	IM	Up to 1 g
Amikacin (A)	15	IM	Up to 1 g
Ethionamide (Eto)	10–15	Oral	Up to 1 g
Cycloserine (Cs)	10	Oral	Up to 1 g
Para amino salicylic acid (PAS)	250	Oral	Up to 1 g
Ofloxacin (Ofx)	15–20	Oral	800–10000 mg
Levofloxacin	7.5–10	Oral	750-1000 mg
Moxifloxacin	7.5–10	Oral	400 mg

Fig 26b: Classification of ATT drugs

INDICATION OF CORTICOSTEROIDS IN TUBERCULOSIS:

1. TB meningitis

2. In seriously ill patients

3. TB in serous sacs (peritonitis, pericarditis and pleural effusion to prevent fibrosis and adhesions and to facilitate absorption of fluid)

4. Genito-urinary TB

5. To control drug hypersensitivity reaction6. Rarely for regression of lymph nodes during chemotherapy

Human Immunodeficiency Virus:

INTRODUCTION:

"In 1981, the first cluster of cases that we now call AIDS was recognized and reported". Nearly all of the early identified cases were in young homosexual men, but it was quickly learned that HIV infection could be transmitted by heterosexual contact and by blood transfer from infected to non infected individuals[7]. "In 1983 it was isolated from a patient with lymphadenopathy and in 1984 it was demonstrated clearly to be the causative agent of AIDS". **India's first case of AIDS was reported in 1986 from Chennai.**

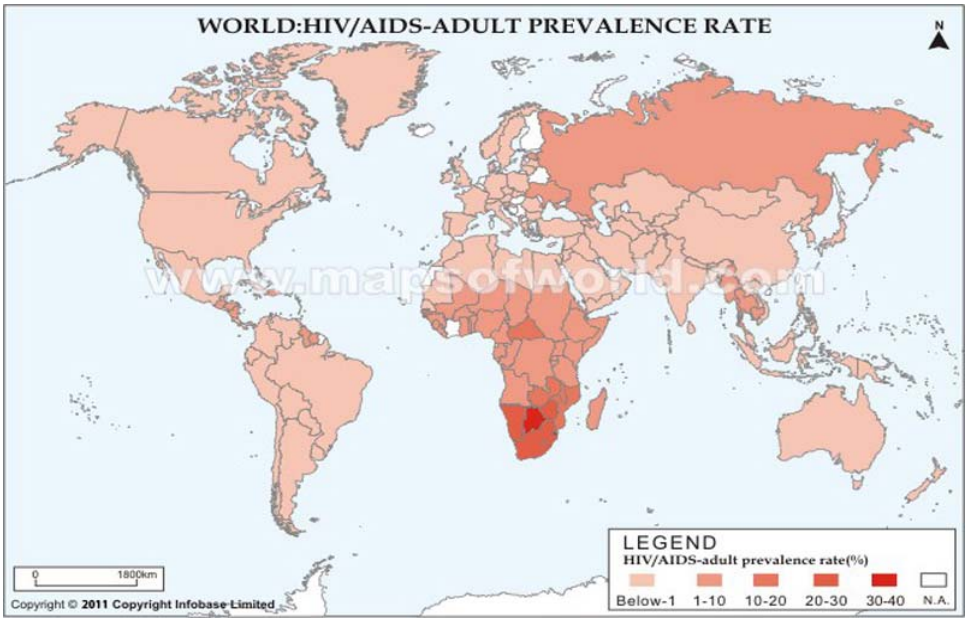
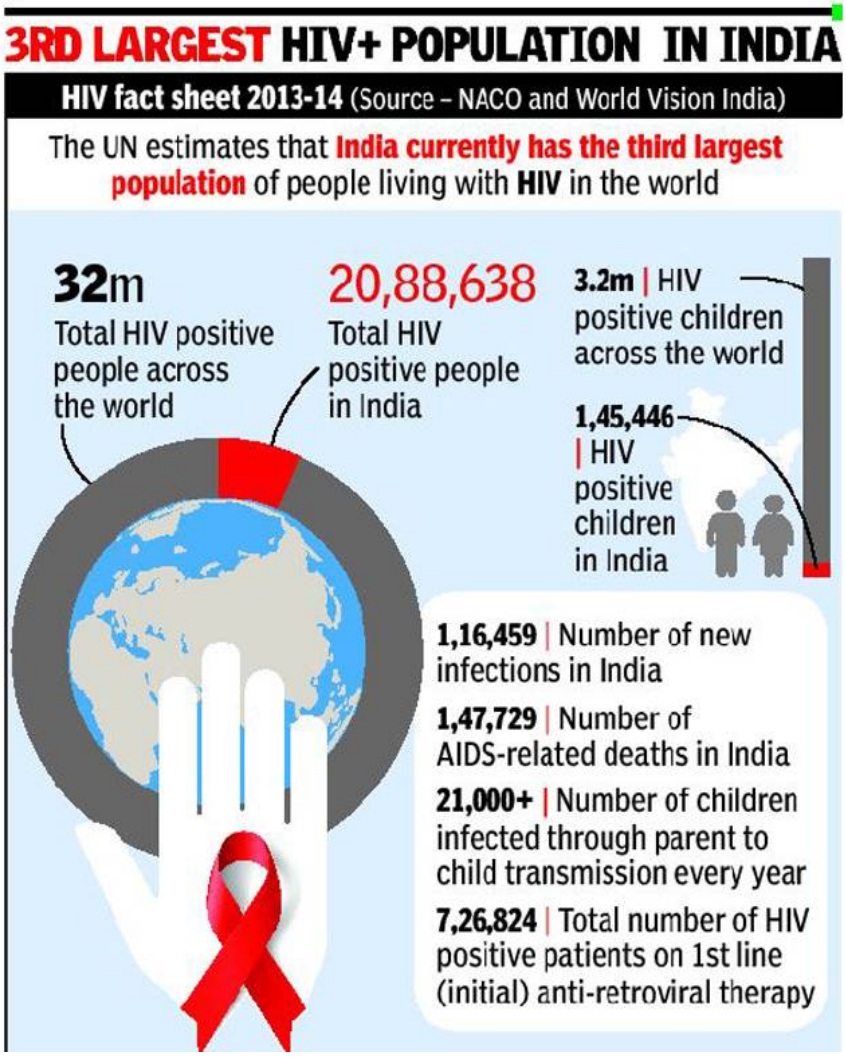


Fig 27: HIV Prevalence rate



EPIDEMIOLOGY

INDIAN SCENARIO:

- Number of people living with HIV: 2.5 million
- India ranks 3rd in total number of HIV patients in world
- Prevalence rate in adult male 0.43 %
- Prevalence rate in adult female 0.29%
- Prevalence in general population 0.36%.
- Percentage of coverage of ART for prevention of mother to child transmission: <25%.

SCENARIO IN TAMILNADU IN 2014

No of PLHA :135000

No of CLHA :6700

No of newinfections :2900

No of AIDS related Deaths :8700

HIV prevalence in different population is as follows:

- Antenatal clinic attendees - 0.25%.
- STD clinic attendees - 8%.
- Female sex workers - 4.62%.
- Men having sex with men - 5.60%.
- Intra venous drug abusers - 24.2%.

ETIOLOGY:

"The etiologic agent of AIDS is Human Immunodeficiency Virus"

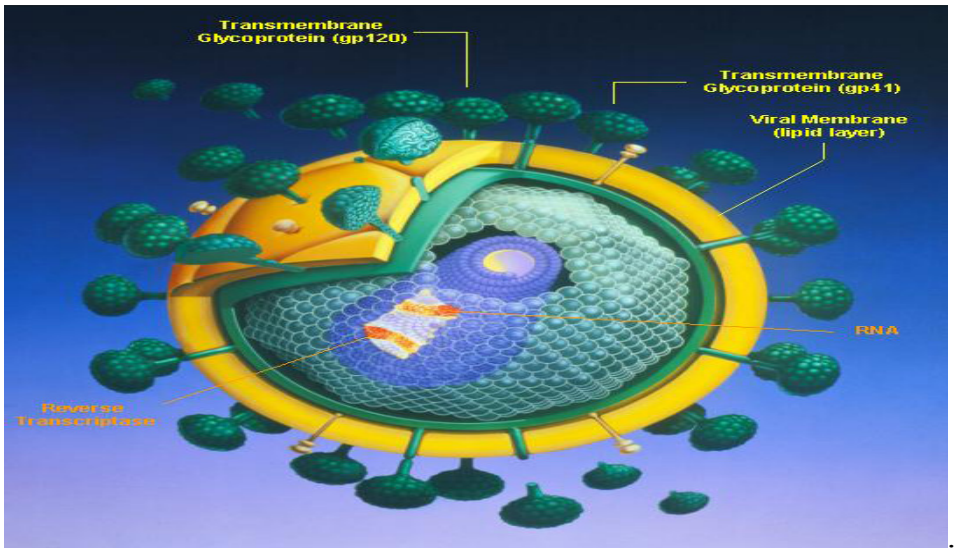


Fig 28: Human Immunodeficiency Virus

LIFE CYCLE:

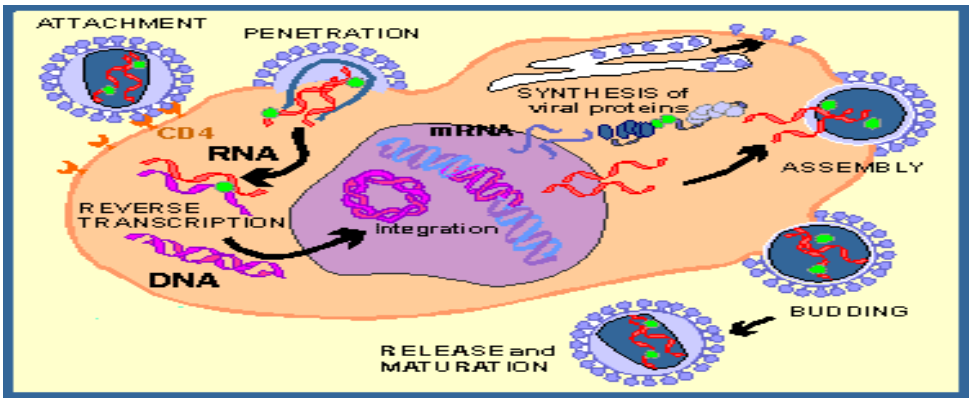


Fig 29: Life cycle of HIV virus

HIV- MODE OF SPREAD:

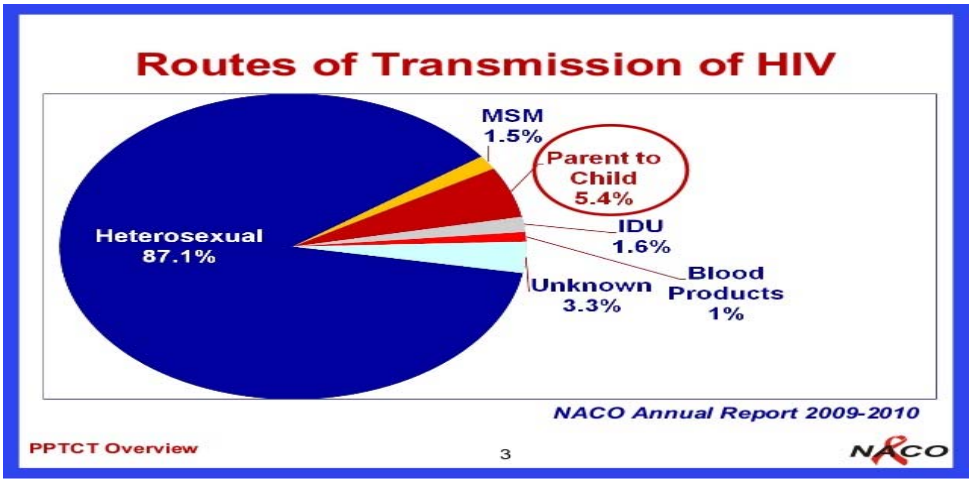


Fig 30: Routes of transmission of HIV

ATTACHMENT AND ENTRY:

"The replication cycle of HIV begins with the high affinity binding of the gp 120 protein via a portion of its v1 region near the N terminus to its receptor on the host cell surface, the CD4 molecule".

"Once gp 120 binds to CD4, the gp 120 undergoes a conformational change that facilitates binding to one of a group of co-receptors". "**CCR5 and CXCR4**. These 2 are major coreceptors"

REVERSE TRANSCRIPTION AND INTEGRATION:

"Following binding of the envelope protein to the CD4 molecule", the virus is "uncoated" and the viral RNA is converted into complementary DNA (C-DNA) by virion associated reverse transcriptase enzyme. The C-DNA is transported to the host cell nucleus and eventually gets incorperated into the host cell chromosomes by virus specific integrase enzyme.

TRANSCRIPTION, TRANSLATION AND REPLICATION:

The integrated DNA is transcribed into messenger RNA (mRNA) which comes out into cytoplasm and viral proteins are synthesized using protein synthesizing machinery and raw material from the host cell. Some of the viral proteins are synthesized as polyproteins that are eventually cleared by the proteinase enzyme.

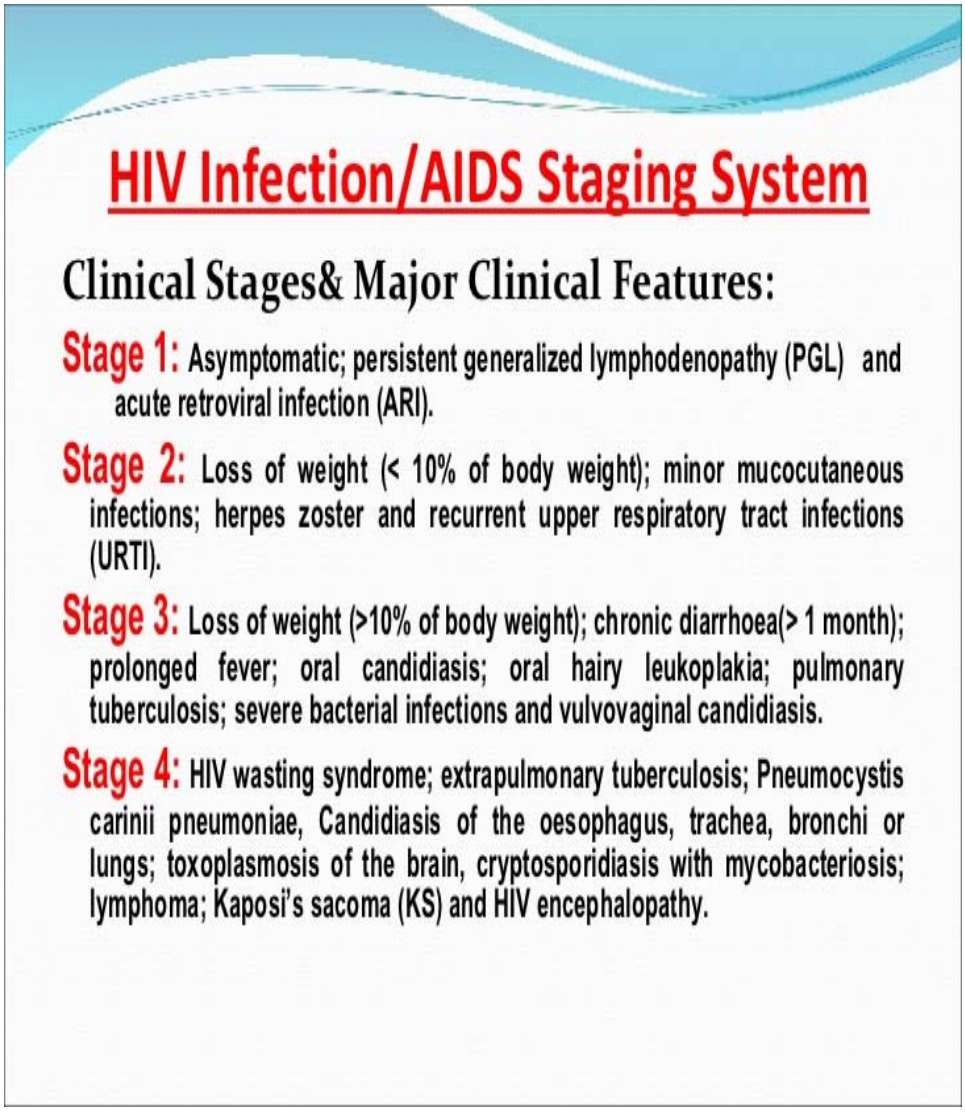
MATURATION AND RELEASE:

Newly synthesized progeny RNA and proteins are packaged together and the newly formed virus particles are released from the infected cell by the budding process[15].

IGRA test for the Diagnosis of LTBI in HIV-Infected Individuals

- Current evidence suggests that IGRA perform similarly to the TST at identifying HIV+ individuals who could benefit from LTBI treatment
- Important questions remain unanswered despite the substantial body of literature on IGRAs:
  - HIV+ individuals with a negative IGRA result may have a low risk of progression to active TB
  - IGRAs (particularly TSPOT) may be more sensitive than TST in HIV-infected individuals and less affected by advanced immunosuppression
  - Clinical Trials are needed to more definitively determine whether IGRAs could improve the identification of people living with HIV
  - Until such data are available, the decision to use IGRA or TST (or both) will depend on national guidelines as well as resource and ogistic considerations.

CLASSIFICATION OF HIV INFECTION - WHO



ANTI RETRO VIRAL DRUGS:

HAART is the cornerstone of management of HIV , Early initiation is the key to prevent morbidity and mortality.

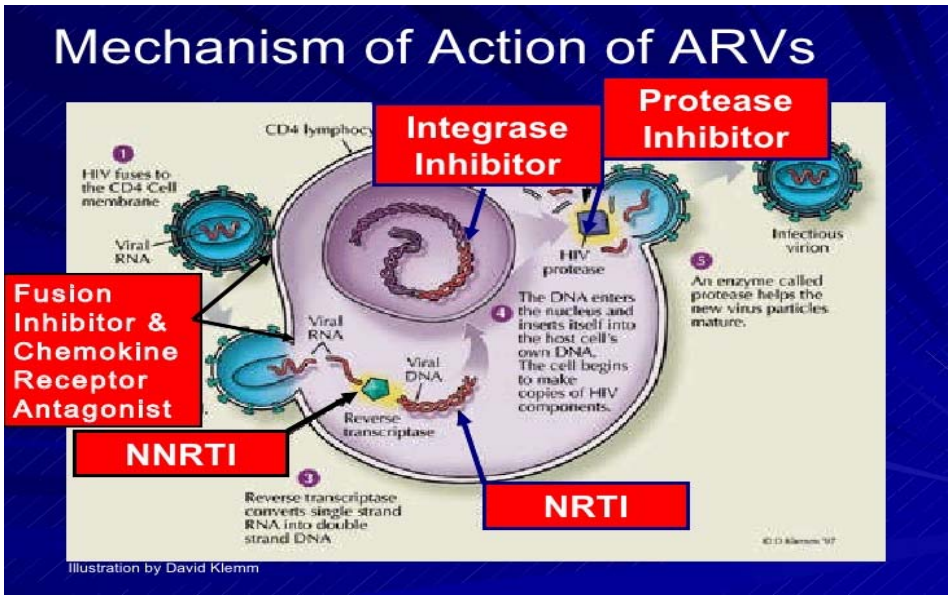


FIG 31: Site of action of HAART

NRTI	NNRTI	Protease inhibitors	Fusion inhibitors
Zidovudine (AZT)	Efavirenz (EFV)	Ritanovir (RTV)	Enfuvirtide
Lamivudine (3TC)	Nevirapine (NVP)	Saquinavir (SQV)	
Emtricitabine (FTC)	Delavirdine (DLV	Indinavir (IDV)	
Stavudine (d4T)		Nelfinavir (NFV)	
Didanosine (ddI)		Fosamprenavir (APV)	
Tenofovir (TDF)		Lopinavir (LPV)	
Abacavir (ABV)		Atazanavir (ATV)	
Zalcitabine (ddC)		Darunavir (DRV)	

Fig 32: Classification of ART

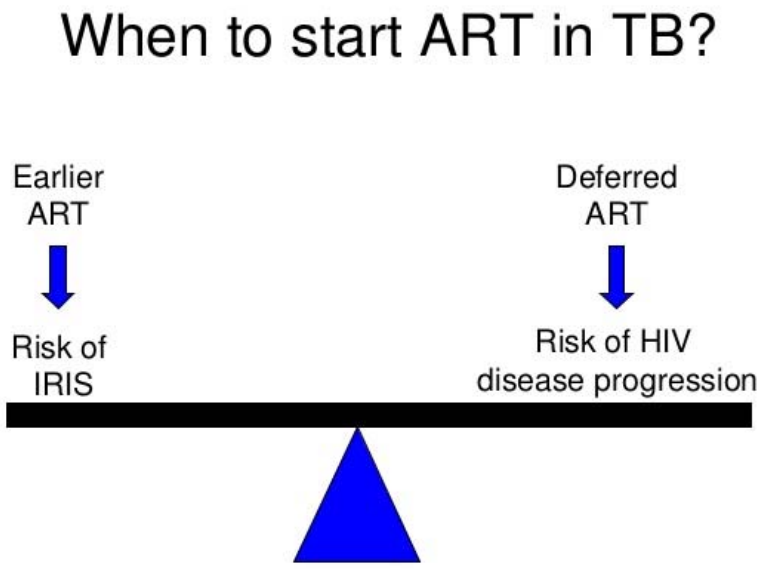
"Early Initiation of ART in HIV-infected TB patients ART reduces both the TB case fatality rates, the incidence of TB, and the incidence of recurrent TB."

"Only patients with isolated pulmonary TB and CD4 count >350 would not immediately be eligible for HAART". "In the absence of ART, TB therapy alone does not significantly increase CD4 cell counts, nor significantly decrease HIV viral load among HIV-infected TB patients [(1)] . “The use of ART in patients with TB can lead to reductions in HIV viral load, immunologic reconstitution, decrease in AIDS defining illness, and reduces the mortality"..zidovudine used when HB >9 gm, Stavudine used when HB less than 9gm. Lamivudine always used as added dug .zidovudine dose is 300 mg BD , Lamivudine dose is 150 mg BD. "Use rifabutin as substitution for rifampicin. "When switching from EFV to NVP, no lead-in dose is required”.

NACO GUIDELINES 2012

Classification of HIV-associated clinical disease	WHO STAGE	CD4 NOT AVAILABLE	CD4 AVAILABLE
Asymptomatic	1	Do not treat	Treat if CD4 <350
Mild symptoms	2	Do not treat	
Advanced symptoms	3	Treat	Consider treatment if CD4 <350 and initiate ART before CD4 drops below 200
Severe/advanced symptoms	4	Treat	Treat irrespective of CD4 count

Fig 33: NACO Guidelines



IMMUNE RECONSTITUTION INFLAMMATORY SYNDROME

"Slight worsening of symptoms and signs of TB or radiological deterioration after the initiation of HAART, [16]even after a reduction in HIV load (>1 log10 copies/µl) and immunological recovery, is known as IRIS"

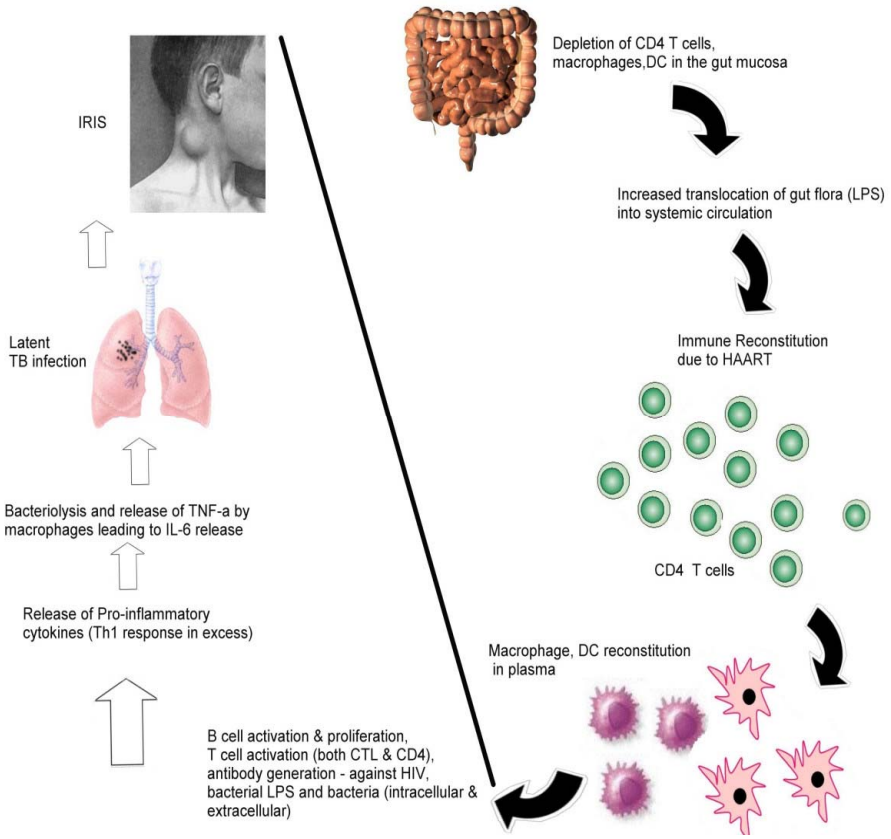


Fig 34: Immunology of IRIS in HIV- TB coinfection

PATHOPHYSIOLOGY OF IRIS:

Poorly understood, mostly due to release of cytokines interferon gamma or lack of inhibitory immune responses.

RISK FACTORS FOR IRIS:

	Risk factor
Host-related	Low CD4 count at initiation of ART
	Opportunistic infection or TB prior to ART initiation
	Genetic predisposition: eg, *HLA-A, -B44, -DR4* (associated with herpes virus IRIS); *TNFA*-308*1, *IL6*-174*G (associated with mycobacterial IRIS)
	Paucity of immune response at OI diagnosis (in the case of C-IRIS)
Pathogen-related	Degree of dissemination of OI/burden of infection (eg, TB, KS, cryptococcosis)
	High pre-ART HIV viral load
Treatment-related	Shorter duration of OI treatment prior to starting ART (paradoxical IRIS)
	Rapid suppression of HIV viral load

Common Manifestations of IRIS

- Anogenital Herpes virus infection
- Genital warts
- Molluscum contagiosum
- Shingles
- Tuberculosis
- MAC Infection
- PCP
- Hepatitis

Sources for pictures: http://www.medicinenet.com

TYPES OF IRIS:

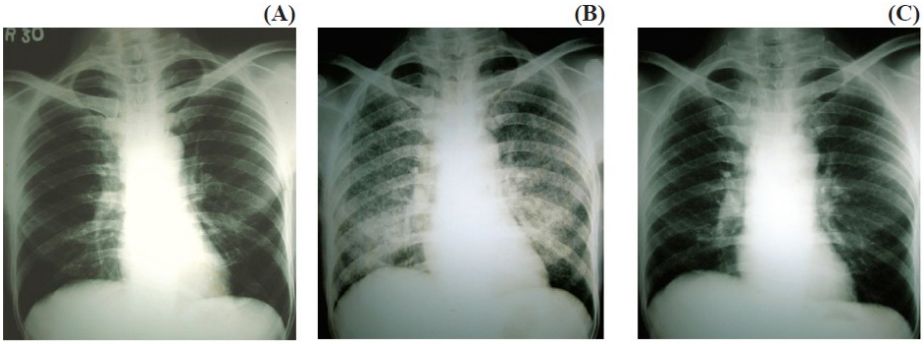
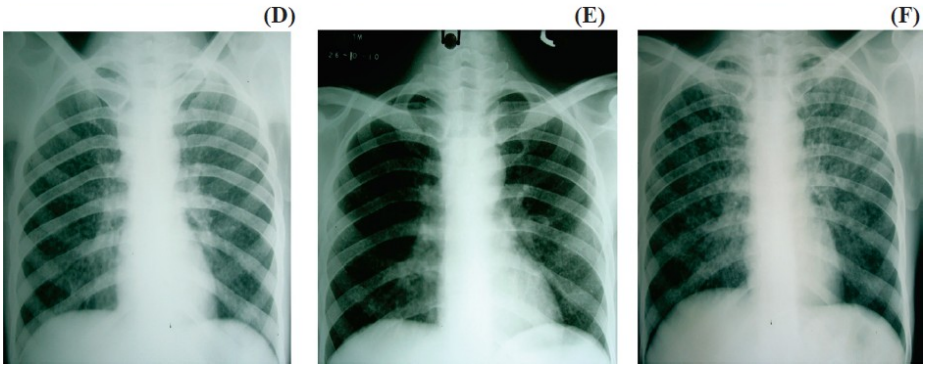


Fig 35: Various types of IRIS

A. ASYMPTAMATIC PATIENT STARTED ON ART

B. MILIARY TB AFTER ART

C. RESOLUTION AFTER ANTI TB DRUGS



D. MILIARY TB OF THE PATIENT WITH BASELINE

E. RESOLUTION AFTER 1 MONTH OF ANTI TB DRUGS

F. FLARE UP OF LESION AFTER HAART (PARADOXICAL WORSENING)

MATERIALS AND METHODS:

Study group : HIV Seropositive with Tuberculosis patients attending ART clinic and those patients admitted in the medical ward Govt Kilpauk Medical College Hospital

Study design : Descriptive study {Cross sectional study}

Place Of Study : Govt. kilpauk medical college

Duration of study : 8 months

Conflict of interest : Nil

Colloborating Depts: Micro-Biology, Bio-Chemistry, Radiology, Chest Medicine.

Sample size $N = Z^2\{P*Q\} / l^2$

Z; with 95% confidence interval z value is taken as 1.96

P;Prevalence of tuberculosis in HIV patients is 20%

Q; 100-p

L; relative precision taken is 50%

So applying these variables in the formula sample size is 64

INCLUSION CRITERIA:

Patients with symptoms like fever, cough with expectoration lasting for more than two weeks, loss of appetite and loss of weight who are found to have HIV seropositive with tuberculosis.

Patients with Tuberculous Pleural Effusion were included in the study.

EXCLUSION CRITERIA:

Patients who are suffering from Extra-pulmonary Tuberculosis like TB Pericarditis, TB meningitis, TB abdomen, isolated TB lymphadenopathy, Potts Spine and other seriously ill patients.

No consensus among all the three independent observers regarding the X-Ray features of Tuberculosis infection.

METHODOLOGY

HIV Seropositive Patients attending ART Clinic and medical wards of kilpauk medical college were screened for Tuberculosis infection. Among 150 HIV seropositive patients screened for tuberculosis, 64 of them were found to have inection.

A brief History of illness was taken from the seropositive individuals and these patients were subjected to the following further investigations that include Complete blood count, Liver Function Test, Renal function test, Sputum Microscopic Examination for Acid Fast Bacilli, Chest X-Ray PA view, Mantoux test (Intradermal tuberculin skin test), CD-4+ cell count. CBC , RFT, LFT are done using the conventional laboratory methods.

Patients were considered to be suffering from Tuberculosis if,

1. Sputum is positive for AFB.
2. The Mantoux test reading shows induration above 5mm.
3. X-Ray features were suggestive of Tuberculosis. Since there is a high reporting of both inter-observer and intra-observer variations, opinions were obtained from three persons separately - a general physician, a thoracic physician and a radiologist and their Tuberculosis status confirmed.

SAFETY

- No harm done to the patient
- No extra expenses to the patients
- Informed consent will be obtained and follow up will be done

RESULTS

The collected data was analysed with SPSS 16.0 version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in Independent groups the Unpaired sample t-test was used. To find the significance in categorical data Chi-Square test was used. In both the above statistical tools the probability value .05 is considered as significant level.

Using this computer software,multiple variables like mean range percentages, standard deviation, chi square and p value etc are used to test for the statistical significance of the study. A p value of less than 0.05 denotes significant relationship.

Table 1 - Age distribution :

Age range	Total no. of patients		Percentage (%)
	Female	Male	
Upto 30yrs	8	0	8
31 - 40 yrs	4	38	42
>40yrs	3	11	14
Total	15	49	64

The age of subjects ranged from 21-46. The mean age was 35.48.minimum age is 21 for female and 31 for male , maximum age of patient in this study for both male and female is 46.

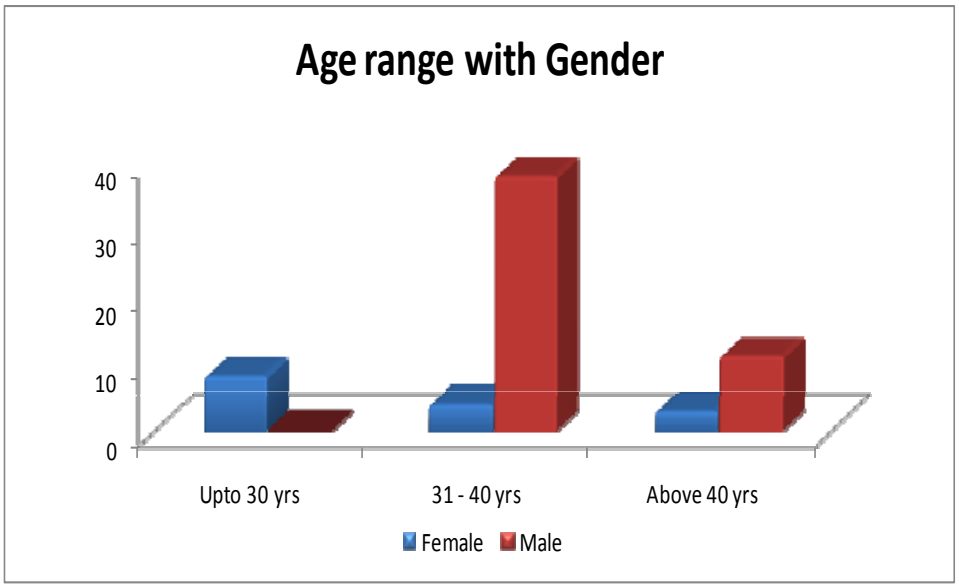


Fig 36 : Comparison of Age distribution with Gender

Table 2 - Sex distribution :

Sex	Total no. of patients	Percentage(%)
Female	15	23.4
Male	49	76.6
Total	64	100.0

Out of the 64 patients, 76.6% (49 patients) were males, 23.4%(15 patients) were females.

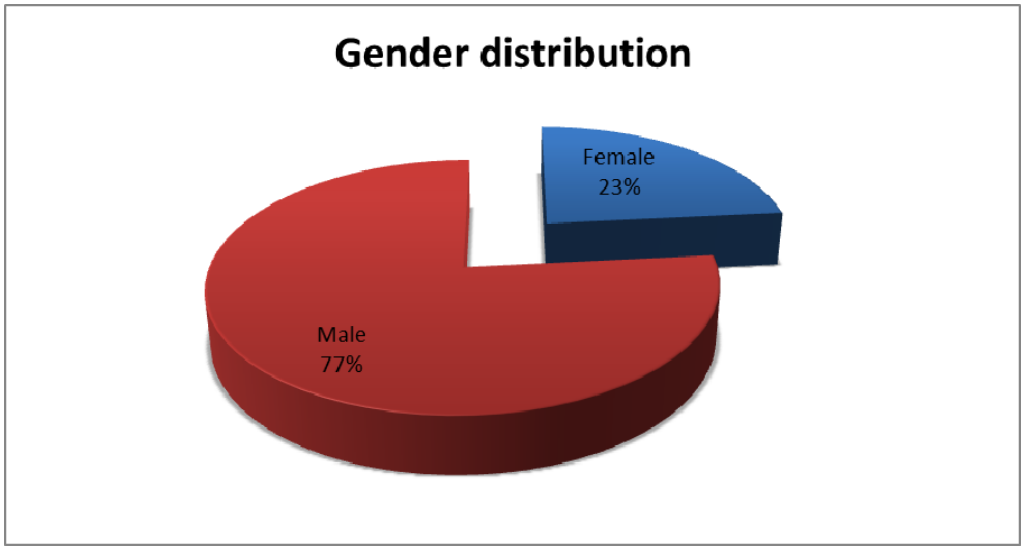


Fig 37 : Distribution of Gender

Table 3 - Distribution of patients according to Occupation

Occupation	Total no. of Patients	Percentage (%)
Agriculture	9	14.1
Business	8	12.5
Driver	31	48.4
House wife	13	20.3
SL	3	4.7
Total	64	100.0

Out of 64 patients driver was the most common occupation 48.4%, in which CD4 count <350 is 23 members

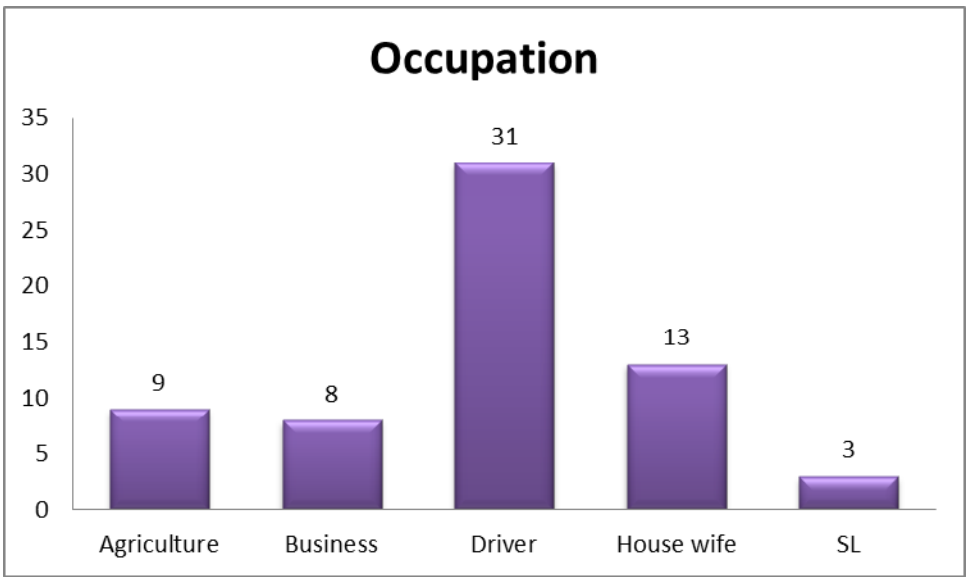


Fig 38 : Distribution of Occupation among study population

Table 4 - Distribution of patients according to Symptoms :

Symptoms	Total no. of Patients	Percentage (%)
Cough	52	81.3
Fever	41	64.1
Loss of wt/Apettite	48	75.0

Among the symptoms cough was the most common symptom, out of 64 patients 52 patients had cough. next one is loss of weight and appetite.

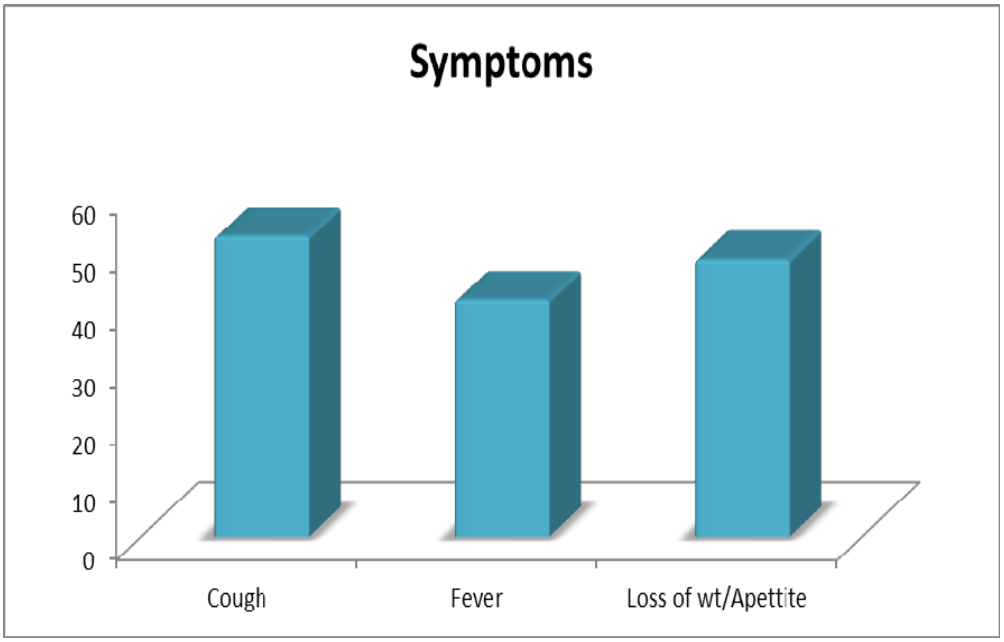


Fig 39 : Distribution of Symptoms among study population

Table 5 - Mantoux test result distribution :

Mantoux test	Total no. of Patients	Percentage (%)
< 5	46	71.9
> 5	18	28.1
Total	64	100.0

Among the study group, 46 Patients(71.9%) had Mantoux <5 mm, 18 patients had Mantoux >5 mm(28.1%).

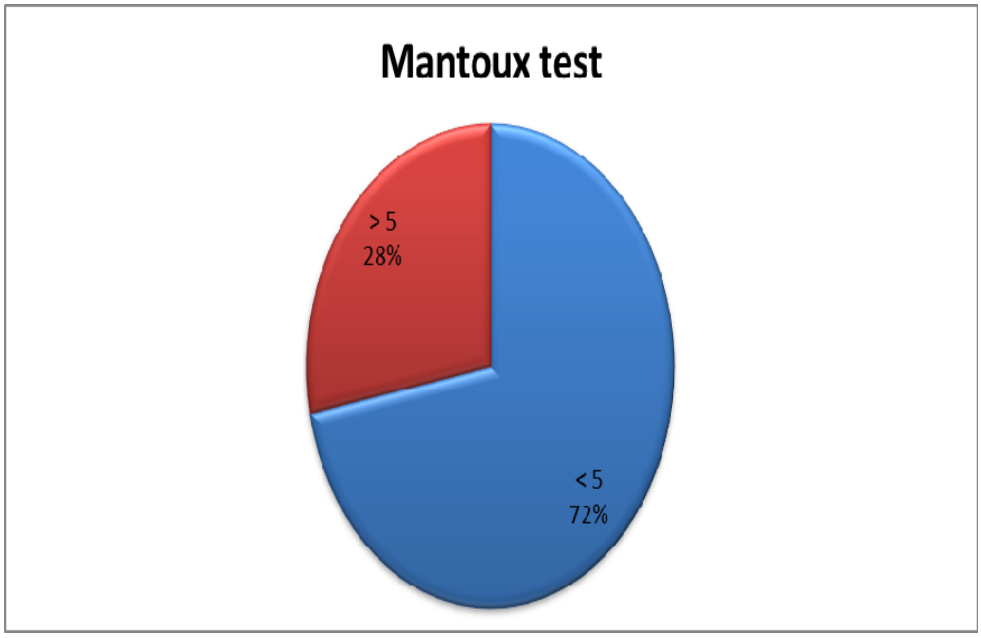


Fig 40 : Distribution of Mantoux test results among study population

Table 6 - Sputum AFB result distribution :

Sputum AFB	Total no. of Patients	Percentage (%)
Negative	51	79.7
Positive	13	20.3
Total	64	100.0

The proportion of sputum positivity was found to be higher in those patients with CD4 count >350 , 10 Patients. In Patients with CD4 count < 350 , sputum positivity was present only in 3 patients

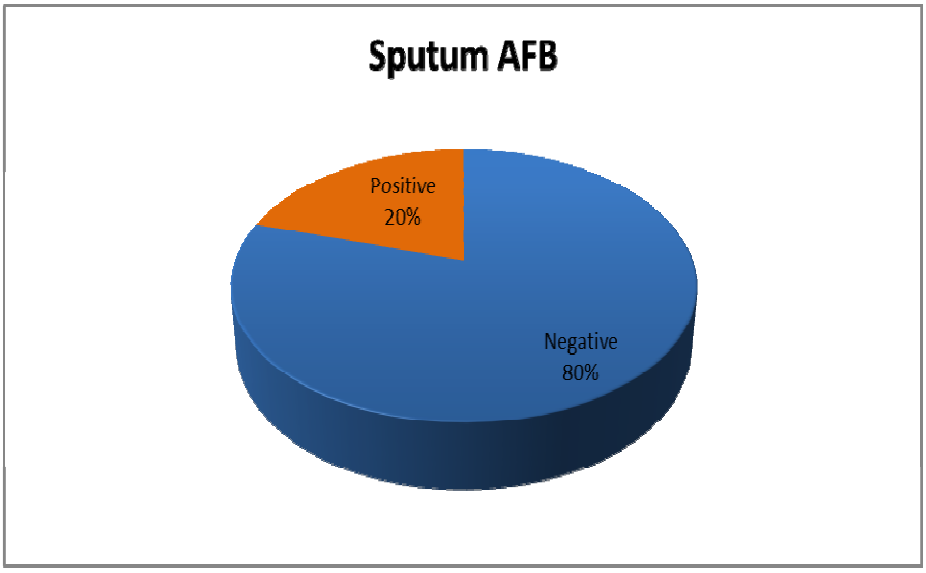


Fig 41 : Distribution of Sputum AFB results among study population

Table 7 - CD4 Count result distribution :

CD4 count	Total no. of Patients	Percentage (%)
> 350	20	31.3
< 350	44	68.8
Total	64	100.0

44 patients had CD 4 Count <350 (Male 36, Female 8 patients), 20 patients had CD4 count >350 (Male 13, Female 7 patients)

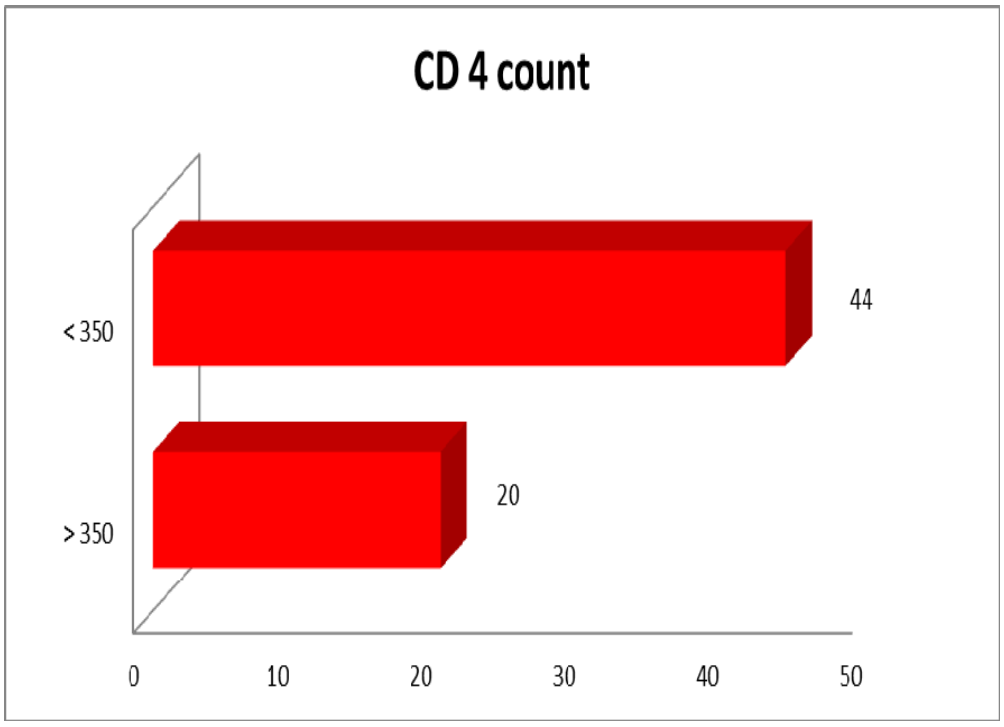


Fig 42 : Distribution of CD4count results among study population

Table 8a - Distribution of Patients according to X ray findings :

X ray findings	Upper lobe	Lower lobe
Cavity	5 (7.8%)	4 (6.3%)
Infiltration	21 (32.8%)	22 (34.4%)
None	38 (59.4%)	38 (59.4%)

In chest x ray upper lobe lesion seen in 26 patients (5 cavity and 21 infiltration), in which CD4 count <350 was 16 patients. lower lobe lesion in 26 patients (4 cavity and 22 infiltrations). Pleural effusions present in 15 patients(23.4% of 64 patients)

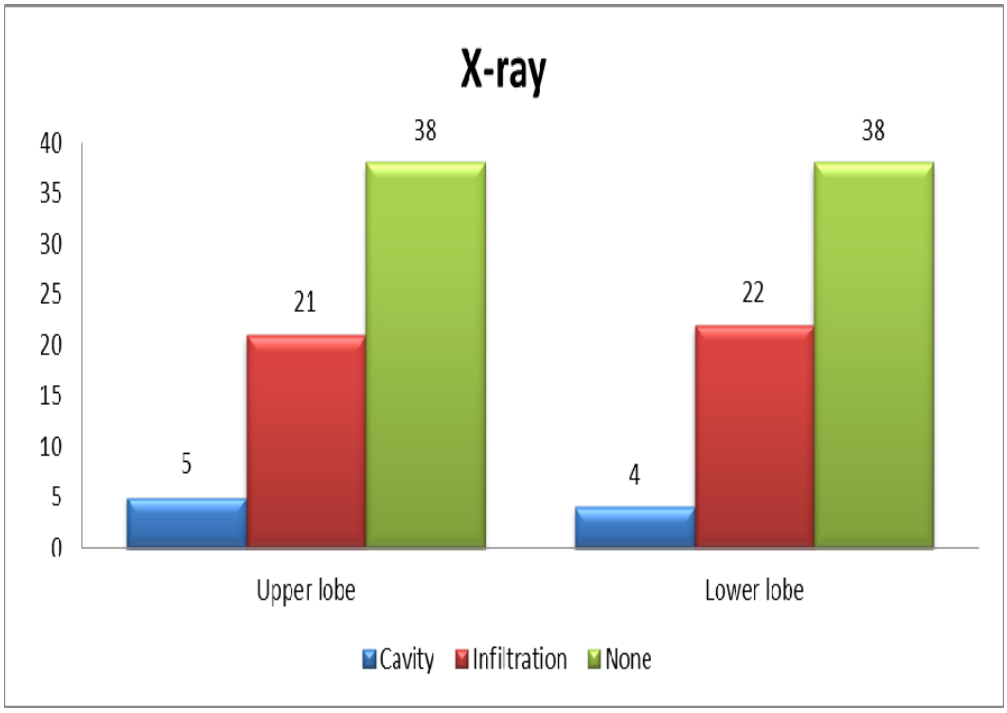


Fig 43 : Distribution of X ray findings among study population

Table 8b - Distribution of Patients according to X ray findings :

X ray findings	Pleural Effusion	Miliary Mottling
No	49 (76.6%)	57 (89.1%)
Yes	15 (23.4%)	7 (10.1%)

Miliary mottling seen in 7 patients among 64 study group, pleural effusion were seen in 15 patients

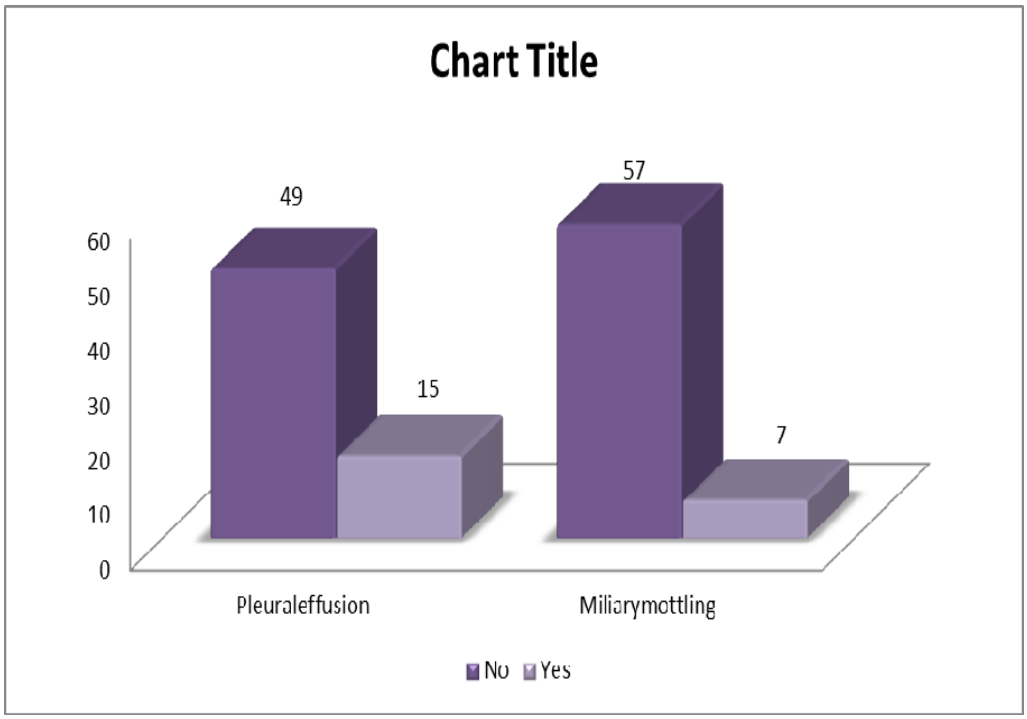


Fig 44 : Distribution of X ray findings among study population

Table 9 - Comparison of Age distribution with CD4 count :

Age range		CD4		Total
		> 350	< 350	
	<30	4	4	8
		(20.0%)	(9.1%)	(12.5%)
	31-40	15	27	42
		(75.0%)	(61.4%)	(65.6%)
	>40	1	13	14
		(5.0%)	(29.5%)	(21.9%)
Total		20	44	64
		100.0%	100.0%	100.0%

p value - 0.064 (not significant)

31 to 40 years age range had more no of patients with CD4 count <350, 27 patients among 44, surprisingly CD 4 count > 350 also seen in 31- 40 yrs group.

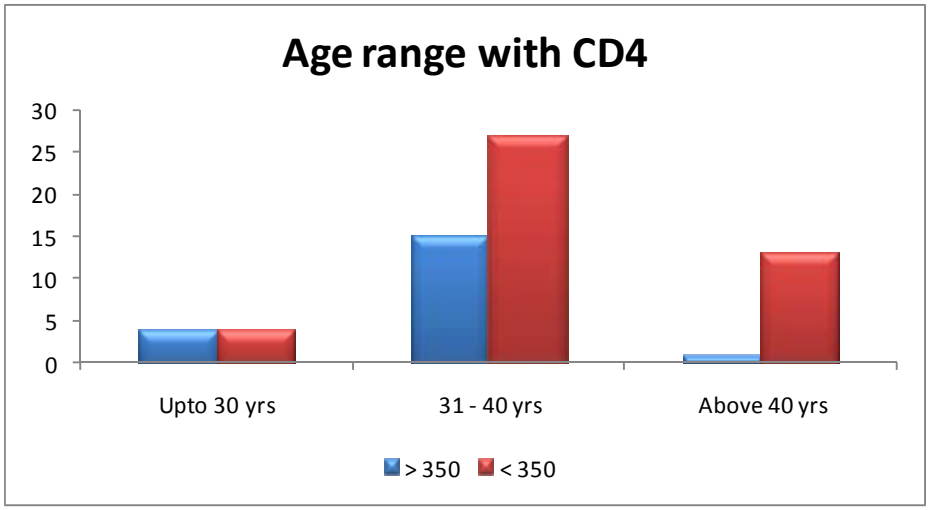


Fig 45 : Comparison of Age with CD4 count among study population

Table 10 - Comparison of Sex distribution with CD4 count :

Sex	CD4		Total
	> 350	< 350	
Female	7 (35.0%)	8 (18.2%)	15 (23.4%)
Male	13 (65.0%)	36 (81.8%)	49 (76.6%)
Total	20 100.0%	44 100.0%	64 100.0%

p value - 0.141 (not significant)

36 male patients and 13 female patients had CD4 count <350

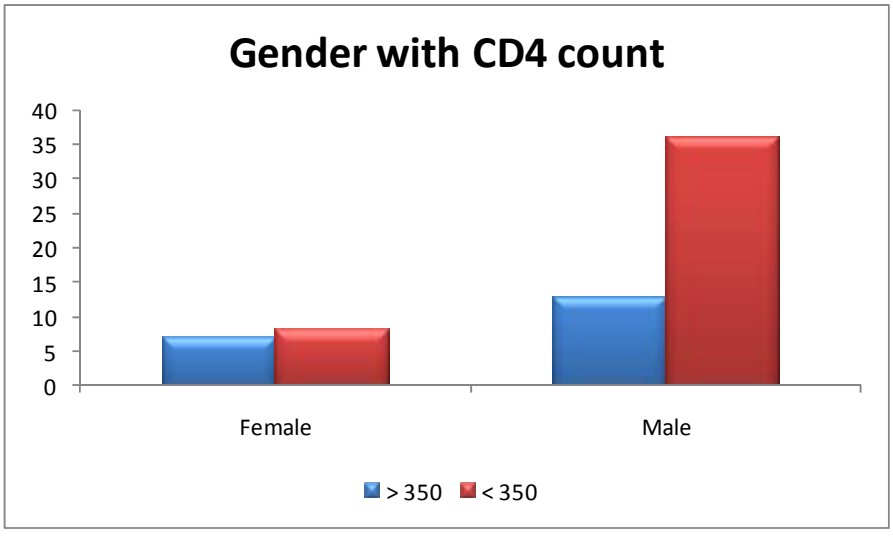


Fig 46 : Comparison of Gender with CD4 count among study population

Table 11 - Comparison of Mantoux test with CD4 count :

Mantoux test	CD4		Total
	> 350	< 350	
< 5	8	38	46
	(40.0%)	(86.4%)	(71.9%)
> 5	12	6	18
	(60.0%)	(13.6%)	(28.1%)
Total	20	44	64
	100.0%	100.0%	100.0%

p value - 0.000 (highly significant)

Mantoux >5 mm seen in 18 patients, out of that 12 patients comes under CD4 Count >350, only 6 patients with CD4 <350 had mantoux >5 mm

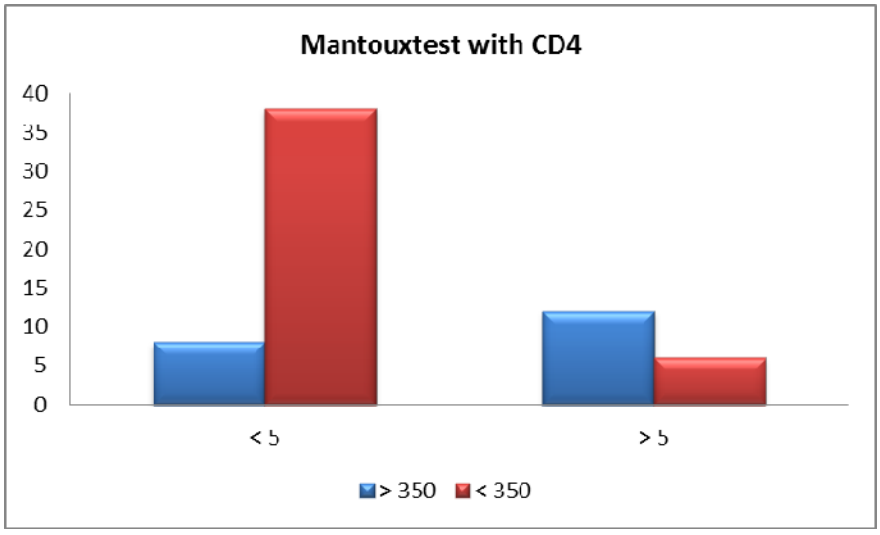


Fig 47 : Comparison of Mantoux with CD4 count among study population

Table 12 - Comparison of Sputum AFB with CD4 count :

Sputum AFB	CD4		Total
	> 350	< 350	
Negative	10	41	51
	(50.0%)	(93.2%)	(79.7%)
Positive	10	3	13
	(50.0%)	(6.8%)	(20.3%)
Total	20	44	64
	100.0%	100.0%	100.0%

p value -0.000(highly significant)

Sputum was positive in 13 patients in which 10 patients were comes under CD4 count more than 350,only 3 patients positive for sputum in CD4 count <350

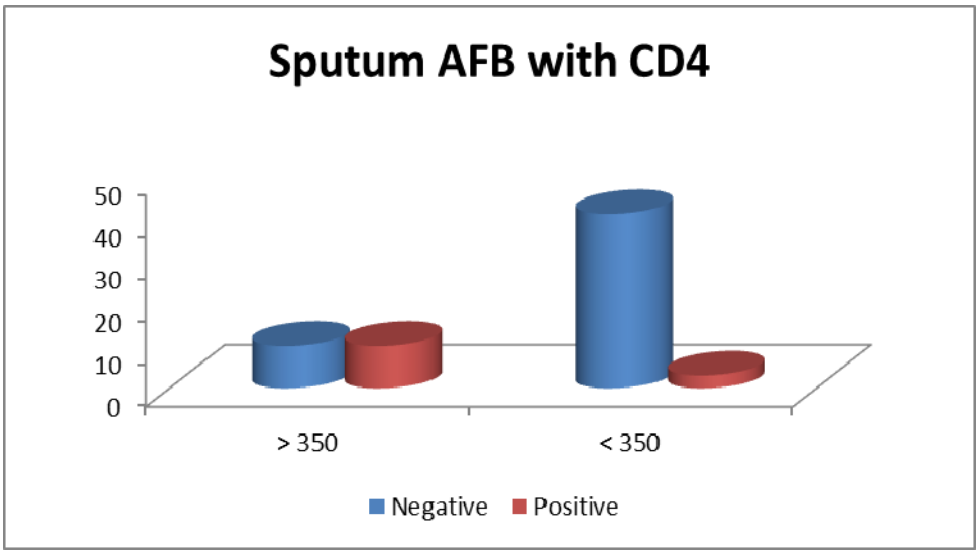


Fig 48 : Comparison of Sputum AFB with CD4 count among study population

Table 13a - Comparison of X ray findings with CD4 count :

X ray findings	Upper lobe		Lower lobe	
	> 350	< 350	> 350	< 350
Cavity	3 (15%)	2 (4.5%)	3 (15%)	1 (2.3%)
Infiltration	5 (25%)	16 (36.4%)	6 (30%)	16 (36.4%)
None	12 (60%)	26 (59.1%)	11 (55%)	27 (61.4%)

In CD 4 count <350 patients cavity comparitively less in both upper lobes and lower lobes.

Upper lobe lesions vs CD4 count, p value -0.291 (not significant)

Lower lobe lesions vs CD4 count , p value- 0.148(not significant)

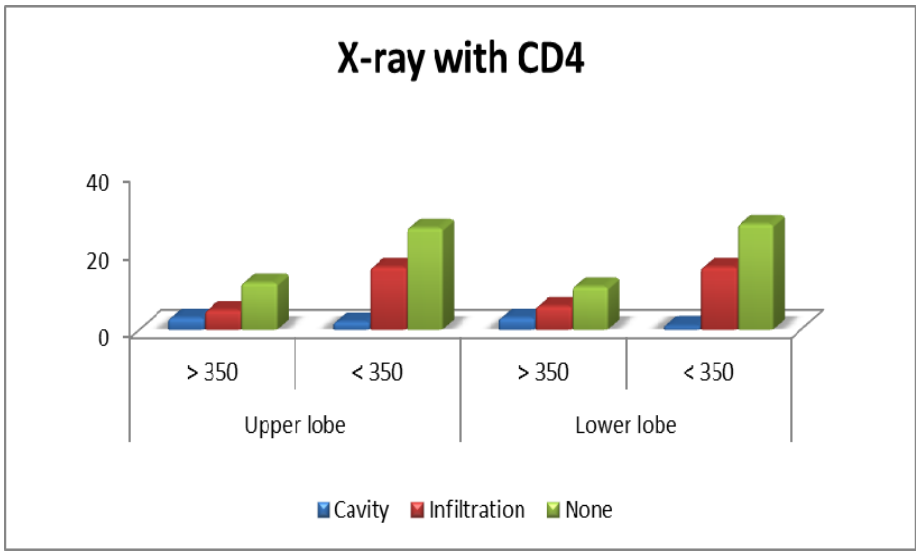


Fig 49 : Distribution of X ray findings with CD4 count among study population

Table 13b - Comparison of X ray findings with CD4 count :

X ray findings	Pleural effusion		Miliary mottling	
	> 350	< 350	> 350	< 350
No	15 (75%)	34 (77.3%)	20 (100%)	37 (84.1%)
Yes	5 (25%)	10 (22.7%)	0 (0%)	7 (15.9%)

Military mottling vs CD4 count p value - 0.059 (significant)

Pleural effusion vs CD4 count , p value -0.842(not significant)

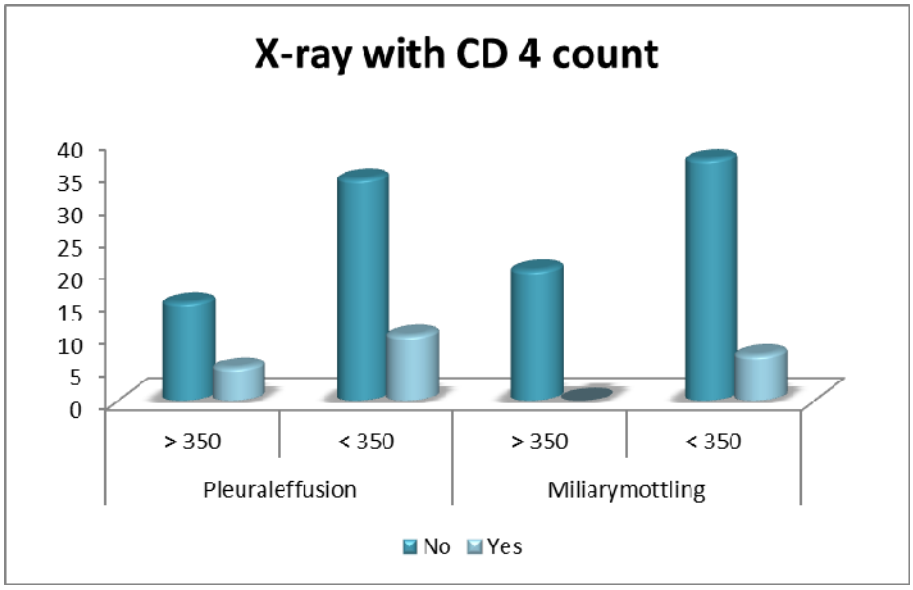


Fig 50 : Distribution of Xray findings with CD4 count among study population

Table 14 - Comparison of results of Sputum AFB with Mantoux test:

Sputum AFB	Mantouxtest		Total
	< 5	> 5	
Negative	40 (87.0%)	11 (61.1%)	51 (79.7%)
Positive	6 (13.0%)	7 (38.9%)	13 (20.3%)
Total	46 100.0%	18 100.0%	64 100.0%

p value -0.021(significant)

7 patients with mantoux >5 mm and 6 patients with mantoux <5 mm had sputum positivity

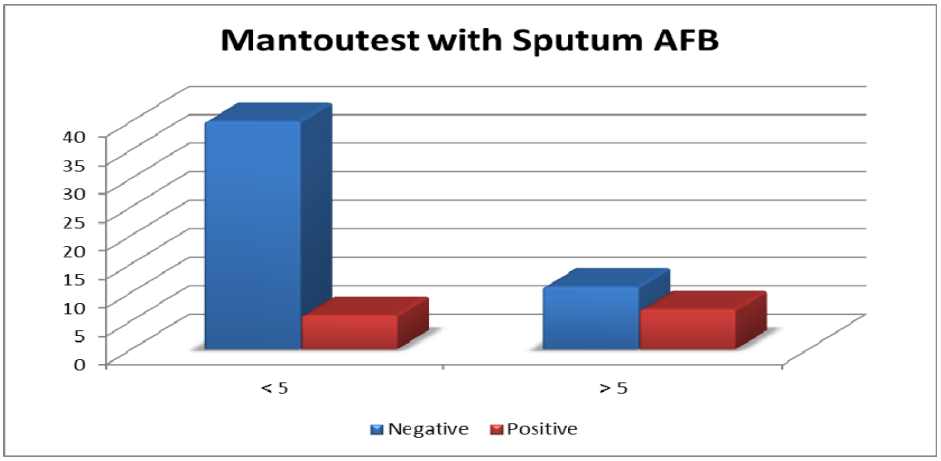


Fig 51 : Comparison of Mantoux test with Sputum AFB among study population

Table 15 - Comparison of results of Symptoms with CD4 count :

Symptom	CD4 count	
	<350	>350
None	2 (10%)	2 (4.5%)
Cough	4 (20%)	15 (34.1%)
Fever	5 (25%)	3 (6.8%)
Both	9 (45%)	24 (54.5%)

p value - 0.141 (not significant)

Symptoms both cough and fever were more seen in CD4 count > 350(54.5%)

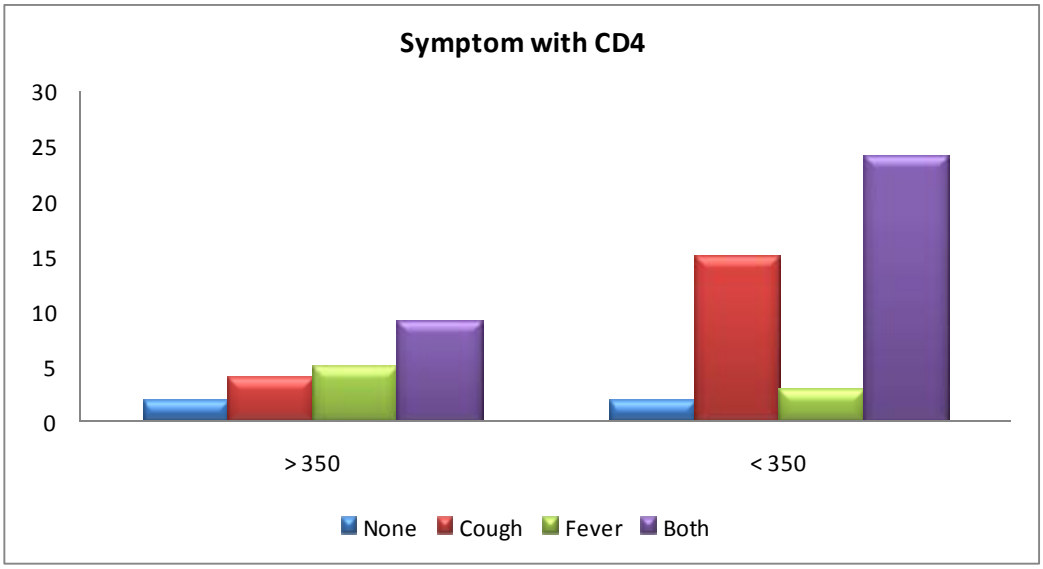


Fig 52 : Comparison of Symptoms with CD4 count among study population

Table 16 - Comparison of results of Upper lobe with Symptoms :

Symptoms X ray findings	None	Cough	Fever
Cavity	0	1	1
Infiltration	3	7	3
None	1	11	4

p value - 0.539 (not significant)

Among Upper lobe lesions commonest symptom was cough followed by fever

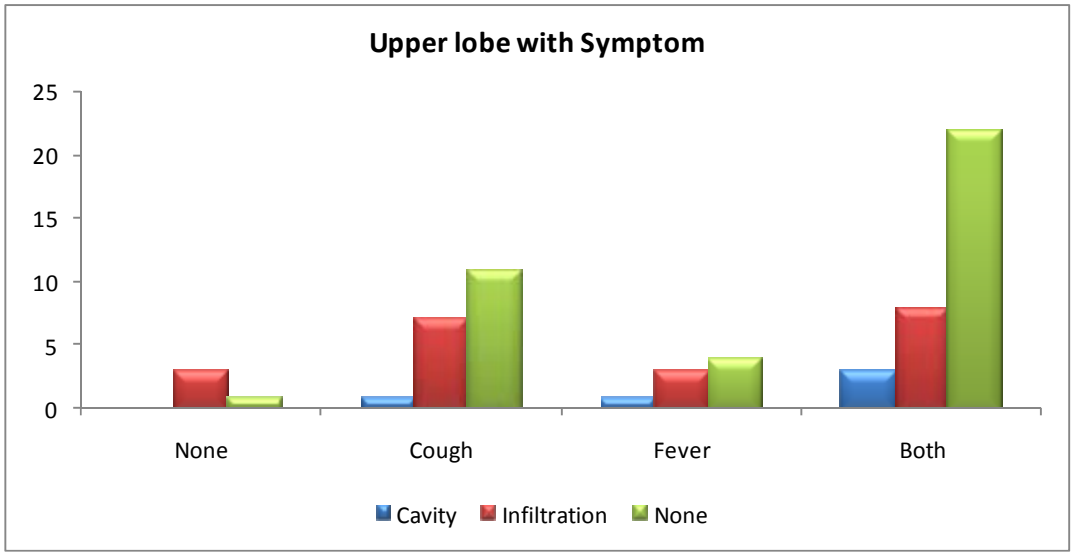


Fig 53 : Comparison of Upper lobe findings with symptoms among study population

Table 17 - Comparison of results of Lower lobe with Symptoms:

Symptoms X ray findings	None	Cough	Fever
Cavity	1	2	0
Infiltration	1	7	1
None	2	10	7

p value - 0.356 (not significant)

In lower lobe lesion cough was the main symptom followed by fever

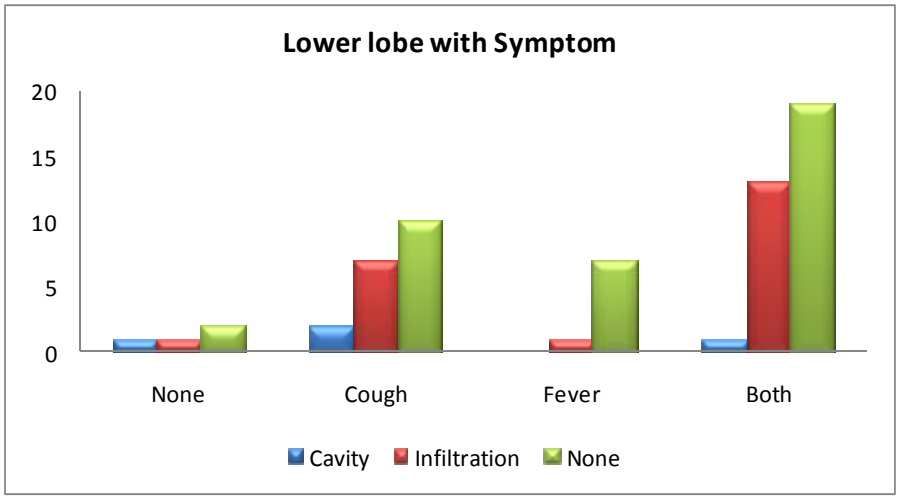


Fig 54 : Comparison of Lower lobe findings with symptoms among study population

Table 18 - Comparison of results of Pleural effusion with Symptoms:

Symptoms X ray findings	None	Cough	Fever
Absent	3	15	5
Present	1	4	3

p value -0.792 (not significant)

15 patients with pleural effusion, commonest symptom was cough followed by fever

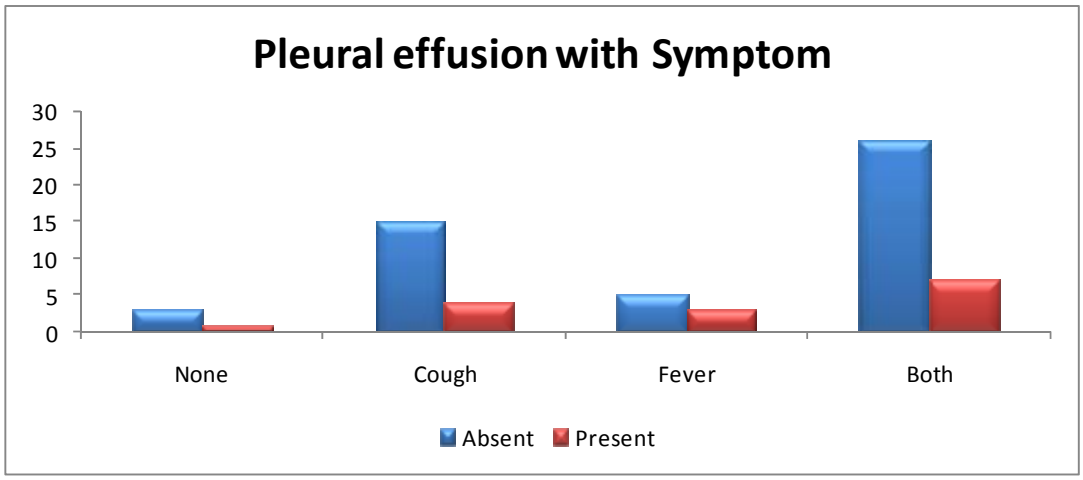


Fig 55 : Comparison of Pleural effusion with symptoms result among study population

Table 19 - Comparison of results of Miliary mottling with Symptoms:

Symptoms / X ray findings	None	Cough	Fever
Absent	4	17	8
Present	0	2	0

p value - 0.556 (not significant)

All 7 patients had cough and loss of wt and appetite, 5 patients had fever

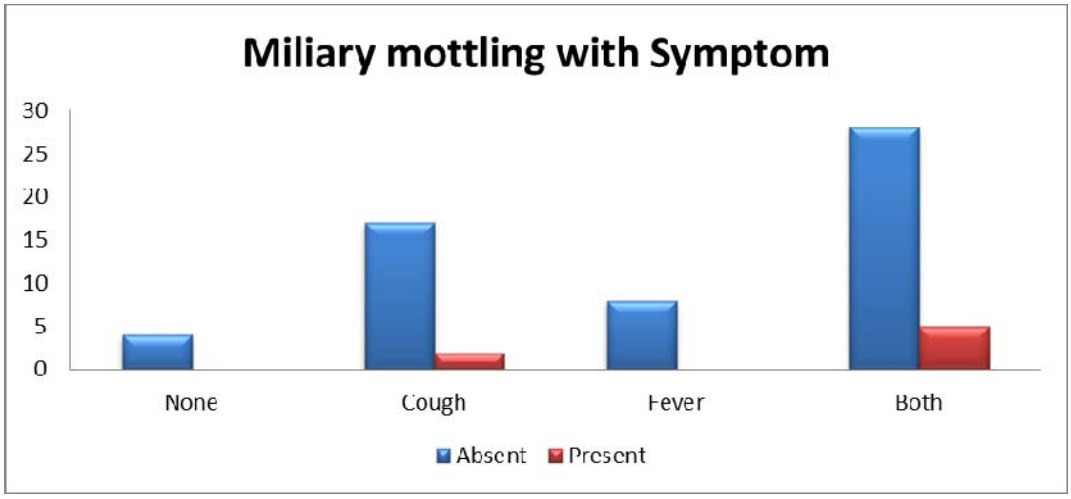


Fig 56 : Comparison of results of Miliary mottling with Symptoms among study population

Table 20 - Comparison of results of Upper lobe findings with Sputum AFB:

Sputum AFB X ray findings	Negative	Positive
Cavity	3	2
Infiltration	18	3
None	30	8

p value 0.431 (not significant)

2 patients with upper lobe cavity and 3 patients with upper lobe infiltrations had sputum positivity

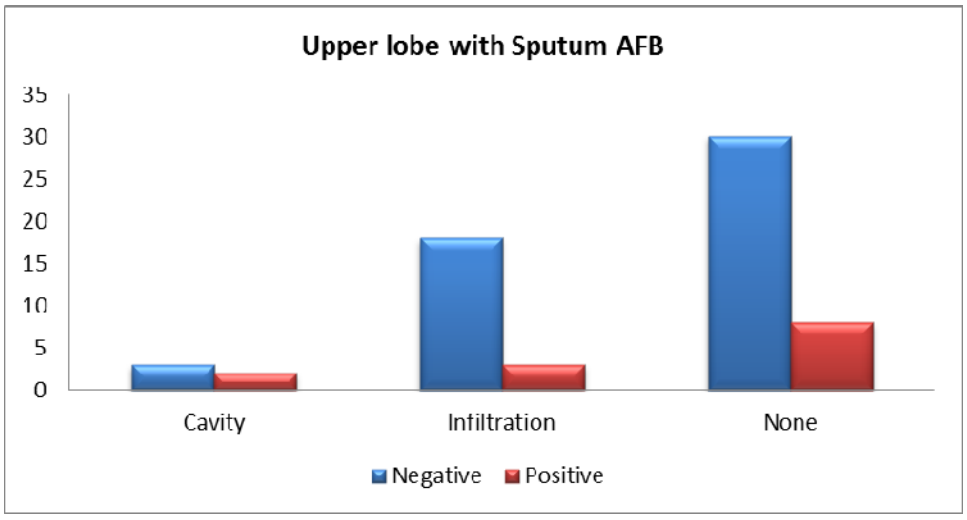


Fig 57 : Comparison of results of Upper lobe findings with Sputum AFB among study population

Table 21 - Comparison of results of Lower lobe findings with Sputum AFB:

Sputum AFB X ray findings	Negative	Positive
Cavity	3	1
Infiltration	18	4
None	30	8

p value - 0.938 (not significant)

1 patient with lower lobe cavity and 4 patients with lower lobe infiltrations had sputum positivity

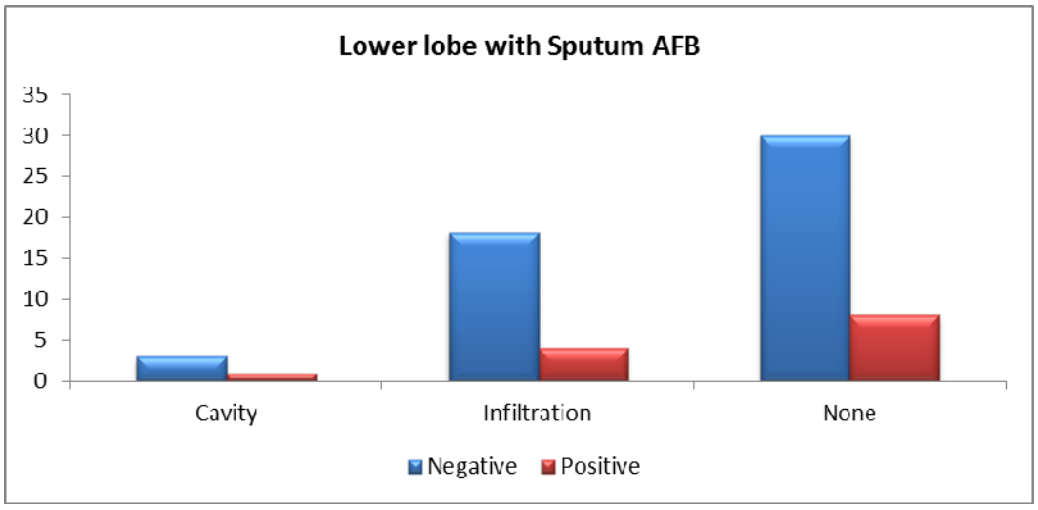


Fig 58 : Comparison of results of Lower lobe findings with Sputum AFB among study population

Table 22 - Comparison of results of Pleural effusion with Sputum AFB :

Sputum AFB X ray findings	Negative	Positive
Absent	38	11
Present	13	2

p value 0.443 (not significant)

Among 15, Two pleural effusion cases had sputum positivity.

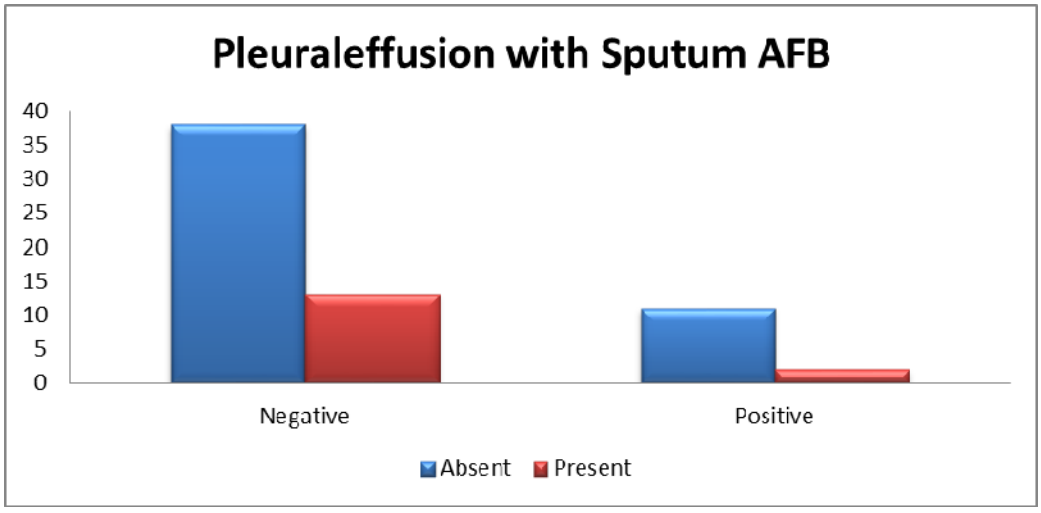


Fig 59: Comparison of results of Pleural effusion with Sputum AFB among study population

Table 23 - Comparison of results of Miliary mottling with Sputum AFB :

Sputum AFB X ray findings	Negative	Positive
Absent	44	13
Present	7	0

p value - 0.157 (not significant)

No military mottling was there in sputum positive patients

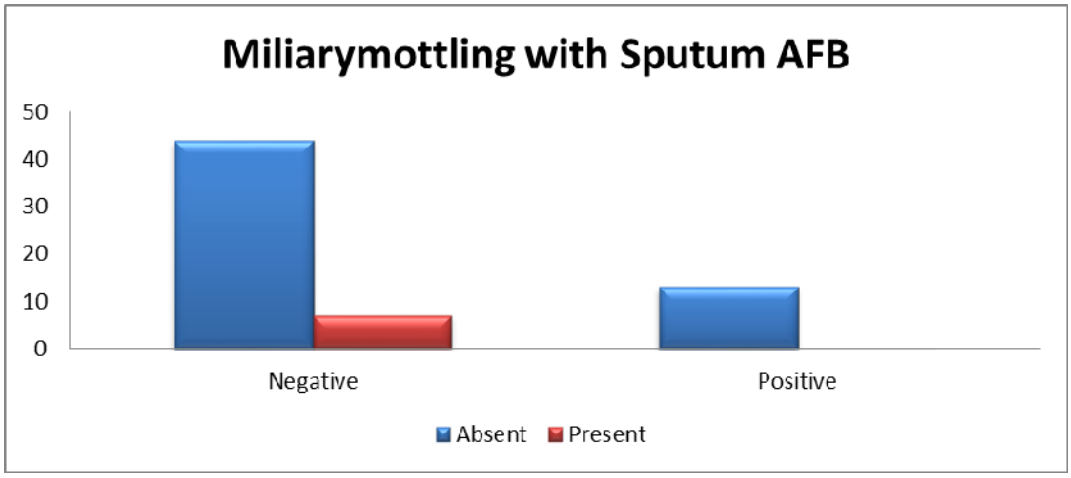


Fig 60 : Comparison of results of Miliary mottling with Sputum AFB among study population

DISCUSSION

In this study, 64 patients with HIV infection was having TB coinfection. Out of these 64 patients, 76.6% (49 patients) were males, 23.4%(15 patients) were females. Out of 64 patients driver was the most common occupation 48.4%, in which CD4 count <350 was 23 members. Among the symptoms cough was the most common symptom, out of 64 patients 52 patients had cough. next one is loss of weight and appetite. The proportion of sputum positivity was found to be higher in those patients with CD4 count >350 , 10 Patients. Patients with CD4 count < 350 sputum positivity was present only in 3 patients. patients had CD4 count range of minimum of 116 and maximum of 510, mean CD4 count is 295.19,mean count in male 289.57, in females mean count is 313.53. 44 patients had CD 4 Count <350 (Males - 36, Females - 8), 20 patients had CD4 count >350 (Males-13, Females -7). In chest x ray upper lobe lesion were seen in 26 patients(5 cavity and 21 infiltration), in which CD4 count <350 in 16 patients. Lower lobe lesion were seen in 26 patients (4 cavity and 22 infiltrations). Pleural effusions were present in 15 patients (23.4% of 64 patients). Mantoux >5 mm seen in 18 patients, out of that 12 patients comes under CD4 Count >350, only 6 patients with CD4 <350 had mantoux >5 mm.

Sputum positivity was 20.3 %among 64 patients. There is no much difference in mantoux positivity with sputum positivity in our study, 7 patients with >5 mm and 6 patients with <5 mm had sputum positivity. Symptoms both cough and fever were more seen in CD4 count > 350, 54.5% with CD4 >350 and 45 % with <350 , only minimal difference was there regarding to symptoms. Two pleural effusion cases had sputum positivity. No military mottling had sputum positivity. 4 miliary mottling had history of Diabetes. 8 Diabetes patients had pleural effusion. 27 patients were diabetic in which 11 had upper lobe lesion (1 cavity ,10 infiltrations)…in diabetic 10 patients had lower lobe lesions. No military mottling was there in sputum positive patients , mostly it was there in CD4 count <350.

LIMITATIONS OF THE STUDY

Sample size was achieved with 10% absolute precision, hence the results of the study will have wide variability. Due to limited resources and practical constraints this study is being carried out with a small sample size. Thus the appropriate representation of the population and better outcomes could be attained by increasing the sample size

SUMMARY AND CONCLUSION

"Incidence of TB, HIV and HIV-TB is higher in India", this study is absolutely justified. Incidence of Tuberculosis in In our country is 185 per lakh population; "there are 25 to 30 lakhs people living with HIV", out of these 55 to 60% will develop Tuberculosis in their life .

a) By studying the clinical, radiological and bacteriological features of pulmonary tuberculosis in HIV patients, we can diagnose the tuberculosis early and can plan for further treatment.

b) "We can prevent the spread of TB in the community by giving treatment as early as possible"

1. Majority of patients were in the age group 30-40 years(42%).
2. Out of 64 people 76.6% were males 23.4% females.
3. Most common presenting symptoms were cough (81.3), loss of wt and appetite (75%)
4. Among x-ray findings Unilateral upper zone infiltrative lesions were more common than lower zone infiltrations in sputum positive patients.

5. Sputum positivity was seen in 20.3%% of patients.
6. Mean CD4 count in this study was 295.19. 313.53 in females, 289.57 in males
7. Most of the patients (68%) had CD4 counts <350 cells/µl.
8. 100% of miliary TB had sputum negativity, all had CD4 count <350
9. 27 patients are Diabetic, out of that 4 patients had military TB, 8 Patients had pleural effusion. 20 patients had CD4 count <350. Lower lobe lesions leen in 10 patients
10. Mantoux >5 mm were seen in 18 patients out of which 12 patients had CD4 Count >350
11. In this study there was highly significant correlation between mantoux vs CD4 count and sputum AFB vs CD4 count present
12. In this study there was significant correlation between sputum AFB vs mantoux and military mottling vs CD4 count present
13. On comparing diabetes with lower lobe lesions , there was significant correlation present, p-value was 0.022.

14. Among the symptoms cough had significant correlation with CD4 count , p value was 0.025

"Thus, a high level of clinical suspicion is required in diagnosis of TB in HIV infected especially when they are in the later stages of disease which is indicated by CD4 counts <350 cells/µl." Tuberculosis is said to be the commonest opportunistic infection in patients with HIV/ AIDS. The most common symptom in these patients was cough and expectoration, followed by fever and weight loss.

Hence, the diagnosis of tuberculosis has to be suspected in HIV positive persons irrespective of the type, site and extent of radiological lesions. Further, since tuberculosis could be present even in persons with a normal chest X-ray, the presence of symptoms warrants detailed investigations.

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LIST OF ABBREVATIONS USED

TB	TUBERCULOSIS
HIV	HUMAN IMMUNODEFIENCY VIRUS
AFB	ACID FAST BACILLI
ATT	ANTI TUBERCULOUS TREATMENT
ART	ANTI RETROVIRAL THERAPHY
HAART	HIGHLY ACTIVE ANTIRETROVIRAL THERAPHY
AIDS	ACQUIRED IMMUNODEFICIENCY SYNDROME
EPTB	EXTRAPULMONARY TUBERCULOSIS
IRIS	IMMUNE RECONSTITUTION INFLAMMATORY SYNDROME
DOTS	DIRECTLY OBSERVED TREATMENT SHORTCOURSE THERAPHY
CPT	COTRIMOXAZOLE PREVENTIVE THERAPHY
CXR	CHEST XRAY
MX	MANTOUX
PLHIVA	PEOPLE LIVING EITH HIV AND AIDS
CBC	COMPLETE BLOOD COUNT
FACS	FLOURESCENSE ACTIVATED CELL SORTING
RNA	RIBO NUCLIC ACID

STUDY PROFORMA

NAME : DIAGNOSIS:

AGE/SEX:

IP/OP NO:

MARITAL STATUS:

EDUCATIONAL STATUS:

OCCUPATION:

WHO STAGE:

ADDRESS:

DETAILS OF PRESENT ILLNESS:

- Cough with expectoration > 2 weeks: Y/N
- Evening rise of temperature: Y/N
- Loss of wt and appetite: Y/N

PAST HISTORY: DM-2 / SHT / TB / CVA /BA/ EPILEPSY,

DRUG HISTORY;

HISTORY OF PREVIOUS ATT, ANTI RETROVIRAL DRUGS FOR HIV

FAMILY HISTORY: DM-2/ SHT/ TB/ BA/ CAD/ EPILEPSY

PERSONAL HISTORY: SMOKING: PACK YEARS

ALCOHOL:Y/N , DURATION

IV DRUG ABUSE:

DIET: VEG/NONVEG

EXPOSURE TO STD:

GENERAL EXAMINATION:

- Built & nourishment:
- Height: weight: BMI:
- P/I/CY/CL/LN/PE

VITAL SIGNS :

- A) PULSE RATE B) BLOOD PRESSURE
- C) TEMPARATURE D) RESPIRATORY RATE

Cutaneous stigmata of TB :

Tinea versicolor, Lupus vulgaris, Erythema nodosum, Scrofuloderma, Healed sinus and scars , cold abscess

Eyes : phylecten, choroid tubercles.

SYSTEMIC EXAMINATION:

RESPIRATORY SYSTEM:

INSPECTION:

TRACHEAL POSITION, APICAL IMPULSE, CHEST WALL DEFORMITY,

- PALPATION

- PERCUSSION
- AUSCULTATION

Breath sounds, added sounds

CARDIOVASCULAR SYSTEM:

ABDOMINAL SYSTEM:

CENTRAL NERVOUS SYSTEM:

INVESTIGATIONS:

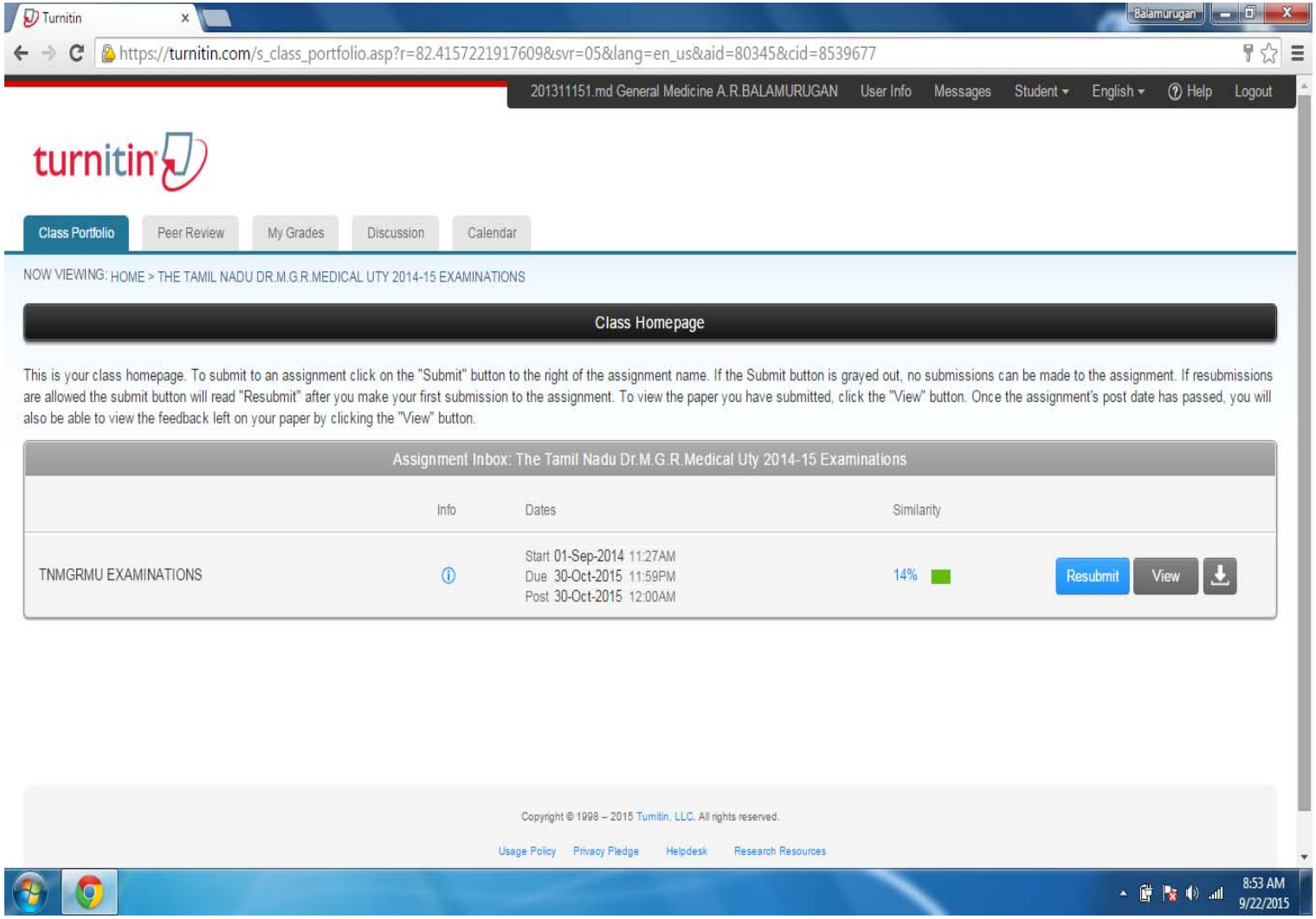
- CBC – TC, DC, ESR, Hb, Platelet count.
- BIOCHEMISTRY:-
  - RBS
  - B.Urea, S.Creatinine.,
  - Serum electrolytes(Na, K,)
- URINE ROUTINE EXAMINATION---sugar,albumin, deposits
- CHEST X-RAY
- ECG
- LIVER FUNCTION TEST (S.BILIRUBIN, SGOT, SGPT,SAP, TOTAL PROTEIN, ALBUMIN, GLOBULIN)
- MANTOUX TEST AND CD4 COUNT

Age	Sex	Occupation	Cough	Fever	Loss of wt & appetite	DM	Mantoux test	Sputum AFB	CD4	CD4 Count	Upper lobe	Lower lobe	Pleural effusion	Miliary mottling	Age Range
22	Female	HW	Present	Present	Absent	No	> 5	Positive	> 350	426	Cavity	None	No	No	Upto 30 yrs
24	Female	HW	Absent	Present	Absent	No	> 5	Negative	> 350	410	Infiltration	None	Yes	No	Upto 30 yrs
23	Female	Agri	Present	Absent	Absent	No	> 5	Positive	> 350	486	None	Infiltration	No	No	Upto 30 yrs
37	Female	HW	Absent	Present	Present	No	< 5	Positive	> 350	421	None	Infiltration	No	No	31 - 40 yrs
26	Female	HW	Present	Present	Absent	No	< 5	Negative	< 350	164	None	None	Yes	No	Upto 30 yrs
36	Female	HW	Absent	Present	Absent	No	< 5	Negative	< 350	330	None	None	No	No	31 - 40 yrs
45	Female	HW	Present	Present	Present	Yes	< 5	Negative	< 350	210	Infiltration	None	No	No	Above 40 yrs
28	Female	Agri	Present	Present	Present	Yes	> 5	Negative	< 350	178	None	None	No	Yes	Upto 30 yrs
38	Female	HW	Absent	Absent	Present	Yes	< 5	Positive	> 350	362	None	Cavity	Yes	No	31 - 40 yrs
46	Female	HW	Present	Absent	Present	Yes	< 5	Negative	< 350	286	Infiltration	None	No	No	Above 40 yrs
25	Female	HW	Absent	Present	Present	No	> 5	Positive	> 350	358	Cavity	None	Yes	No	Upto 30 yrs
31	Female	HW	Absent	Absent	Present	No	> 5	Negative	> 350	434	Infiltration	None	No	No	31 - 40 yrs
21	Female	HW	Present	Present	Present	Yes	< 5	Negative	< 350	220	None	None	No	No	Upto 30 yrs
45	Female	HW	Present	Present	Present	Yes	> 5	Negative	< 350	142	None	None	Yes	No	Above 40 yrs
29	Female	HW	Absent	Present	Present	No	< 5	Positive	< 350	276	None	None	No	No	Upto 30 yrs
43	Male	Agri	Present	Absent	Present	Yes	< 5	Negative	< 350	336	Cavity	None	No	No	Above 40 yrs
32	Male	Business	Present	Present	Present	Yes	< 5	Negative	< 350	310	Infiltration	None	No	No	31 - 40 yrs
41	Male	Driver	Present	Present	Absent	No	< 5	Negative	< 350	220	None	Infiltration	Yes	No	Above 40 yrs
37	Male	Business	Present	Present	Present	Yes	< 5	Negative	< 350	168	None	Infiltration	No	Yes	31 - 40 yrs
40	Male	Driver	Present	Present	Present	No	< 5	Negative	< 350	220	None	Infiltration	Yes	No	31 - 40 yrs
42	Male	Agri	Present	Present	Present	No	< 5	Negative	< 350	310	Cavity	None	No	No	Above 40 yrs
40	Male	Driver	Present	Present	Absent	Yes	< 5	Positive	> 350	406	None	Infiltration	No	No	31 - 40 yrs
41	Male	Driver	Present	Present	Present	Yes	> 5	Negative	> 350	510	None	Infiltration	No	No	Above 40 yrs
39	Male	Agri	Present	Present	Present	Yes	< 5	Negative	< 350	116	None	None	No	Yes	31 - 40 yrs
31	Male	Business	Absent	Present	Present	No	< 5	Negative	< 350	169	Infiltration	None	Yes	No	31 - 40 yrs
33	Male	Business	Present	Absent	Present	No	> 5	Positive	> 350	386	Infiltration	None	No	No	31 - 40 yrs
44	Male	SL	Present	Absent	Present	Yes	< 5	Negative	< 350	260	None	None	No	No	Above 40 yrs
38	Male	Driver	Present	Present	Present	No	< 5	Negative	< 350	276	Infiltration	None	No	No	31 - 40 yrs
32	Male	Business	Present	Present	Present	No	< 5	Positive	> 350	359	None	None	No	No	31 - 40 yrs
37	Male	Driver	Present	Present	Present	Yes	> 5	Negative	> 350	391	None	Cavity	Yes	No	31 - 40 yrs
31	Male	Driver	Absent	Absent	Present	No	< 5	Negative	< 350	286	Infiltration	Infiltration	No	No	31 - 40 yrs
34	Male	Business	Present	Present	Absent	No	> 5	Positive	> 350	416	None	None	No	No	31 - 40 yrs

41	Male	Driver	Present	Present	Present	Yes	< 5	Positive	< 350	310	None	None	No	No	Above 40 yrs
36	Male	Driver	Present	Present	Absent	No	< 5	Negative	< 350	136	None	None	No	No	31 - 40 yrs
42	Male	Agri	Present	Present	Present	No	< 5	Negative	< 350	220	Infiltration	None	No	Yes	Above 40 yrs
31	Male	Business	Absent	Absent	Present	No	> 5	Positive	< 350	260	Infiltration	None	No	No	31 - 40 yrs
38	Male	Driver	Present	Present	Present	Yes	< 5	Negative	< 350	220	None	Infiltration	Yes	No	31 - 40 yrs
35	Male	Driver	Present	Present	Present	Yes	> 5	Negative	< 350	322	Infiltration	None	Yes	No	31 - 40 yrs
38	Male	Agri	Present	Present	Present	Yes	< 5	Negative	< 350	164	Infiltration	None	No	Yes	31 - 40 yrs
37	Male	Driver	Present	Absent	Present	Yes	< 5	Negative	> 350	398	None	Cavity	Yes	No	31 - 40 yrs
44	Male	Driver	Present	Present	Present	No	< 5	Negative	< 350	282	None	Infiltration	No	No	Above 40 yrs
32	Male	Driver	Present	Present	Absent	No	> 5	Negative	< 350	294	None	None	No	No	31 - 40 yrs
35	Male	SL	Present	Absent	Present	No	< 5	Negative	< 350	320	None	Infiltration	No	No	31 - 40 yrs
37	Male	Driver	Present	Present	Present	Yes	< 5	Negative	< 350	286	None	Infiltration	No	No	31 - 40 yrs
41	Male	Driver	Present	Absent	Present	Yes	< 5	Negative	< 350	256	Infiltration	None	Yes	No	Above 40 yrs
36	Male	Driver	Present	Absent	Present	No	< 5	Negative	< 350	232	None	Infiltration	No	No	31 - 40 yrs
31	Male	Business	Present	Present	Absent	No	> 5	Negative	> 350	402	Cavity	None	No	No	31 - 40 yrs
33	Male	Driver	Present	Absent	Present	No	< 5	Negative	< 350	310	Infiltration	None	No	No	31 - 40 yrs
38	Male	Driver	Present	Present	Present	No	< 5	Negative	< 350	294	None	Infiltration	No	No	31 - 40 yrs
43	Male	Agri	Present	Present	Absent	No	< 5	Negative	< 350	210	None	Infiltration	No	No	Above 40 yrs
35	Male	Driver	Present	Absent	Present	No	< 5	Negative	< 350	160	None	Infiltration	No	No	31 - 40 yrs
37	Male	Driver	Present	Absent	Present	No	< 5	Negative	< 350	152	None	Infiltration	No	Yes	31 - 40 yrs
46	Male	Driver	Present	Present	Present	Yes	> 5	Negative	< 350	390	Infiltration	Infiltration	No	No	Above 40 yrs
36	Male	Driver	Absent	Present	Present	Yes	> 5	Negative	> 350	370	Infiltration	None	No	No	31 - 40 yrs
32	Male	Driver	Present	Absent	Present	No	< 5	Negative	> 350	402	None	None	No	No	31 - 40 yrs
40	Male	Agri	Present	Absent	Absent	Yes	< 5	Negative	< 350	220	None	Cavity	No	No	31 - 40 yrs
35	Male	Driver	Present	Present	Present	No	< 5	Negative	> 350	426	None	Infiltration	No	No	31 - 40 yrs
31	Male	Driver	Present	Absent	Present	Yes	< 5	Negative	< 350	258	Infiltration	None	No	No	31 - 40 yrs
36	Male	Driver	Present	Absent	Present	No	< 5	Negative	< 350	222	Infiltration	None	No	Yes	31 - 40 yrs
35	Male	SL	Present	Present	Absent	No	> 5	Positive	> 350	362	Infiltration	Infiltration	No	No	31 - 40 yrs
31	Male	Driver	Absent	Present	Absent	Yes	< 5	Negative	> 350	382	None	None	No	No	31 - 40 yrs
33	Male	Driver	Present	Absent	Present	No	< 5	Negative	< 350	399	None	Infiltration	No	No	31 - 40 yrs
34	Male	Driver	Present	Absent	Absent	Yes	< 5	Negative	< 350	172	Infiltration	None	Yes	No	31 - 40 yrs
31	Male	Driver	Present	Absent	Present	No	< 5	Negative	< 350	219	None	Infiltration	Yes	No	31 - 40 yrs

KEYS TO MASTER CHART:

SL	-	SKILLED LABOUR
HW	-	HOUSE WIFE
Y	-	YES
N	-	NO
P	-	PRESENT
A	-	ABSENT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INSTITUTIONAL ETHICAL COMMITTEE
GOVT.KILPAUK MEDICAL COLLEGE,
CHENNAI-10
Protocol ID No.08/01/2015 Dt. 20. 01.2015
CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "A study of Clinical, Bacteriological and Radiological pattern of pulmonary tuberculosis among HIV seropostitive individuals in Govt. KMC Hospital". -For Project Work-submitted by Dr.A.R. Balamurugan, PG in General Medicine, KMC, Chennai-10.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

20/1/15

CHAIRMAN,
Ethical Committee
Govt.Kilpauk Medical College,Chennai

19/1/2015

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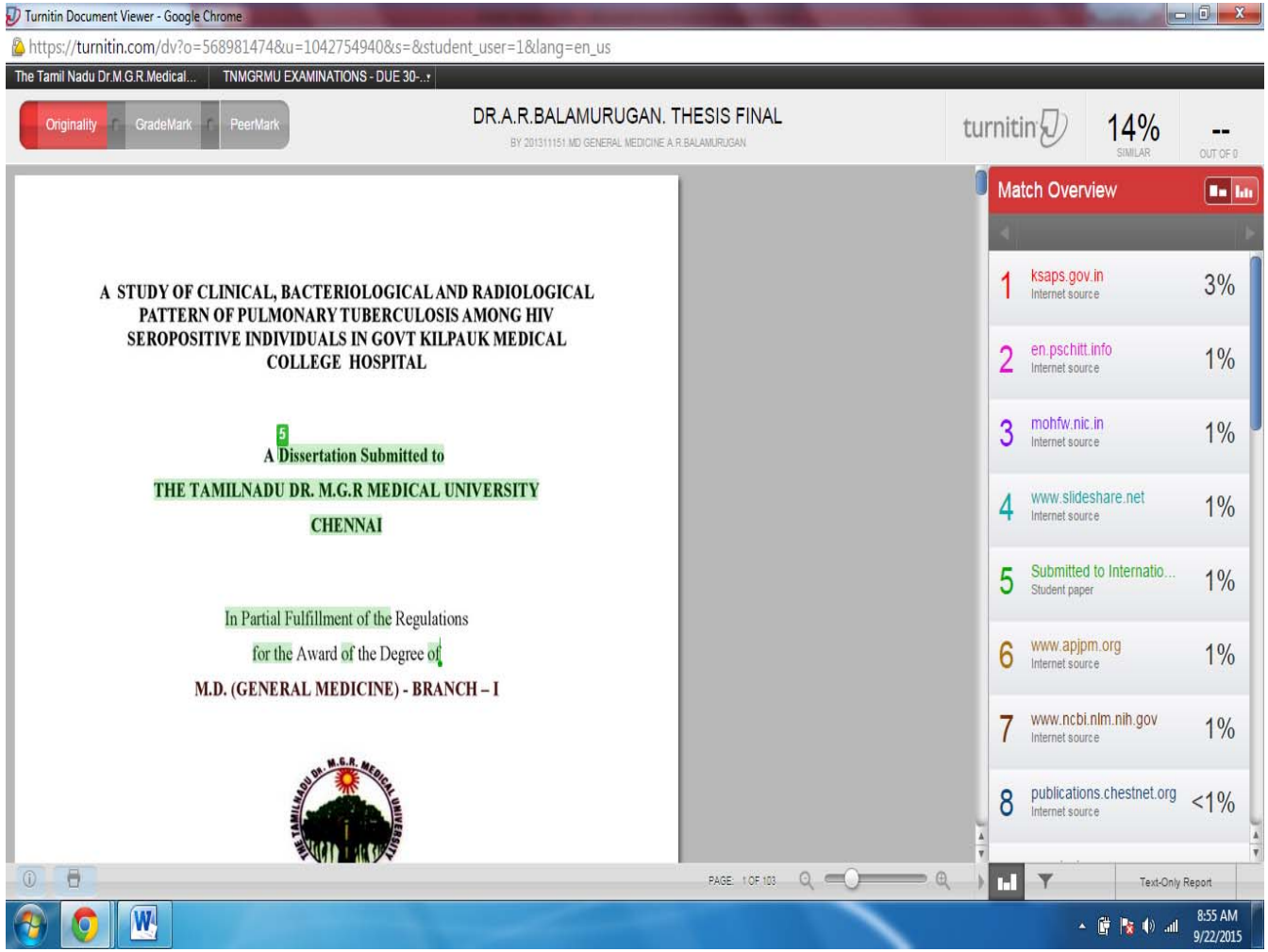
6 Comp.> ME 1> Ethical Committee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A Dissertation Submitted to
THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY
CHENNAI
In Partial Fulfillment of the Regulations
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